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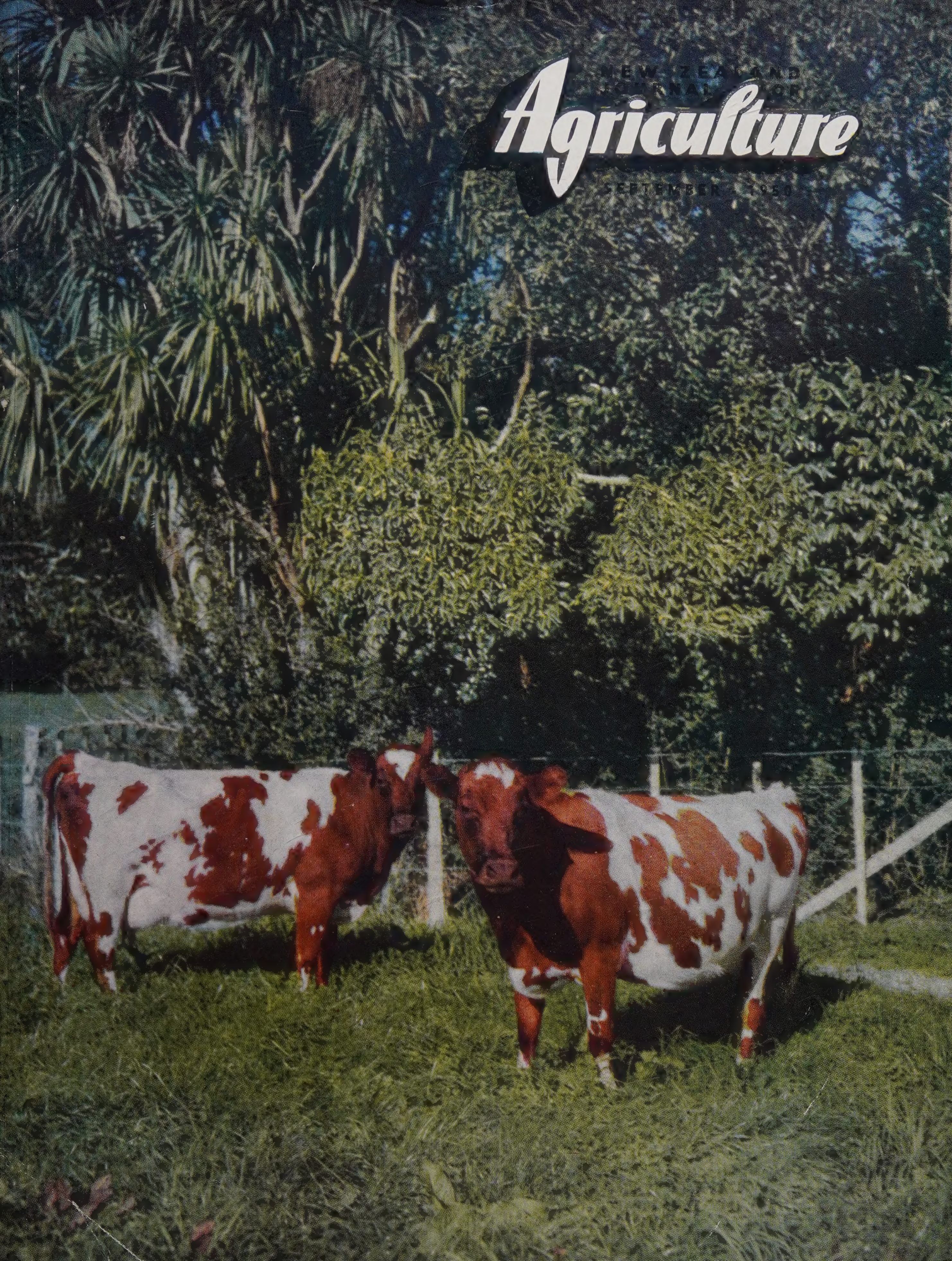
JOURNAL OF

Agriculture

SEPTEMBER — 1950



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NEW ZEALAND JOURNAL OF Agriculture

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This month's cover

Agriculture

A set of identical twin cows at the Ruakura Animal Research Station of the Department of Agriculture is the subject of this month's cover, which has been reproduced from a natural-colour photograph by National Publicity Studios. Identical twins have provided the research worker with a tool which promises to lead to more accurate information about cattle than any research method hitherto available to him. The Ruakura work with identical twins should be as closely watched by dairy farmers in New Zealand as it is by leading dairy scientists overseas.

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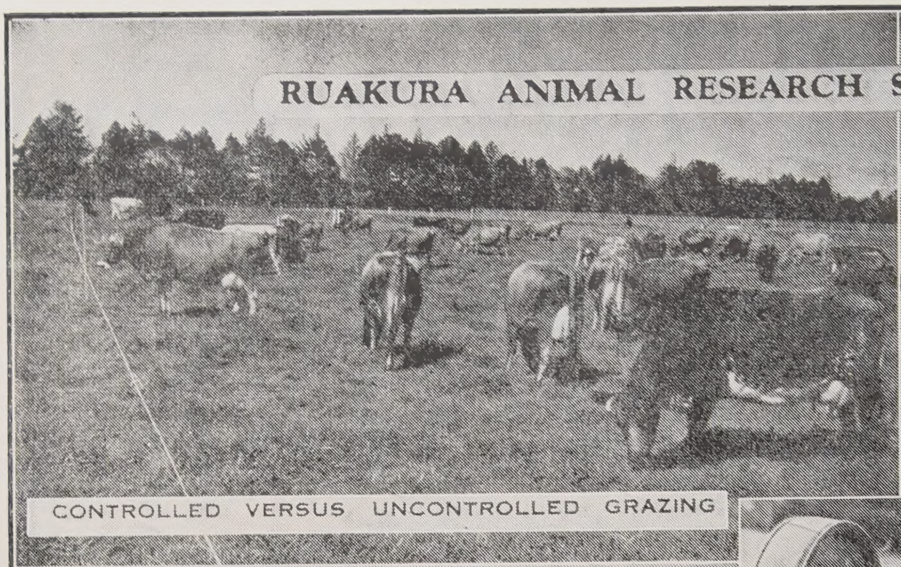
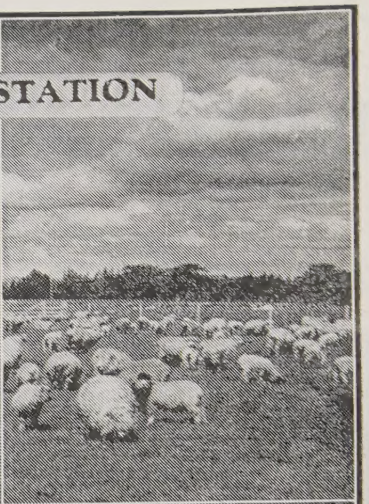
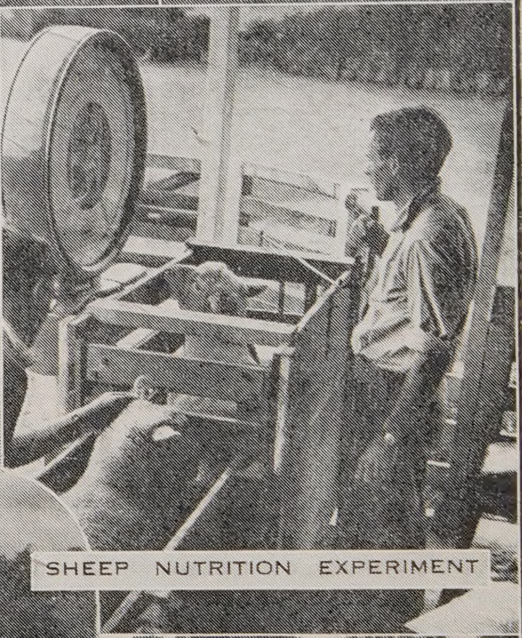
RUAKURA ANIMAL RESEARCH STATION



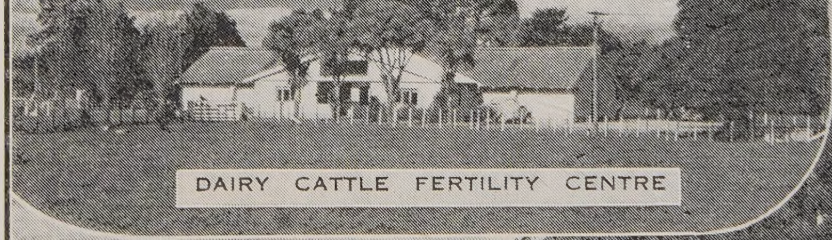


CONTROLLED VERSUS UNCONTROLLED GRAZING

The Department of Agriculture Animal Research Station, Ruakura, is concerned primarily with problems affecting the productive efficiency of farm animals. Therefore, the work at the station is loosely divided into five main sections: Animal breeding, animal nutrition, animal fertility including artificial insemination, general biology including specialised studies of meat production, milk secretion, and endocrinology, and biochemistry with special reference to animal nutrition, animal metabolism, photosensitivity diseases, and toxicology. Much information has already been obtained which, if put into general farm practice, would increase productive efficiency.



SHEEP NUTRITION EXPERIMENT



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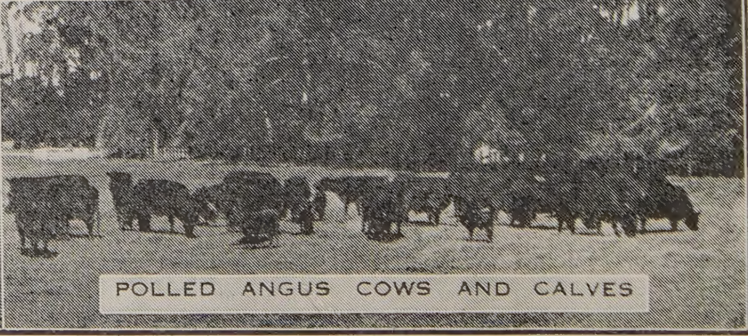


POLLED ANGUS COWS AND CALVES

The Value of Animal Research to the Farmer

THIRTEEN years ago a noted British authority on farm animals visited New Zealand to advise on the organisation of animal research. This visit arose from a growing appreciation by farmers of the need for intensive study of all aspects of animal production. Ideas finally crystallised in the establishment of the Animal Research Division by the Department of Agriculture. War hindered the early life of the new Division, but the tempo of developmental work has increased markedly in post-war years. Today New Zealand has a well-organised animal research service which I believe compares more than favourably with similar services in other countries. The calibre of its research officers and the quality of their work have become not only more readily appreciated by our own farming community each year, but have also attracted world-wide attention.

Animal Disease Problems

Research activities are broadly divided into two main types handled at two main centres. Thus all phases of animal disease are the responsibility of the Wallaceville Research Station. Here a team of highly trained specialists not only handle the day-to-day diagnostic problems of the field veterinarians, but each year add an imposing body of new knowledge to the field of animal health. The maintenance of animal health is basic to efficient production. Wallaceville's work on the control of contagious abortion with Strain 19 vaccine, of peat scours by copper in trace amounts, and of blood poisoning in sheep by vaccination with black-leg vaccine illustrates the way in which the husbandry methods of most farmers have been influenced with outstanding benefits during recent years. Rapid and efficient diagnosis of the cause of animal losses provides a daily service to veterinarians and farmers throughout the country.

Animal Production Problems

The second broad subdivision of activities is the responsibility of the Ruakura Research Station. Here a large number of workers concentrate upon problems of animal improvement through breeding, feeding, and management.

Though not so spectacular in their measurable effects upon farm economy, the improvements in general care and management of farm stock resulting from careful research at Ruakura have been shown to be capable of effecting tremendous increases in productive efficiency. Recent advances in methods of rotational grazing of calves, of nutrition of dairy cows through controlled grazing management, and of milking methods can be applied immediately with beneficial results by the dairy industry. Studies of ewe nutrition and of fat-lamb production have likewise pointed the way to increased efficiency of the fat-lamb farmer.

These methods are being applied by many progressive farmers and I am certain that all farmers can benefit by keeping in close touch with this class of research work.

A National Coverage

In these two Stations the objective has been to build up an organisation capable of handling any major problem of animal production. Concentration on only two main stations has been essential. Research equipment and facilities are expensive and competent research personnel are in short supply. The establishment of district stations throughout New Zealand could only result in inefficiency, even if the country could afford the cost of unnecessary duplication.

It is sometimes claimed that work done at Ruakura is not applicable to farms in Southland or Hawkes Bay, but those making such criticisms forget that work at Ruakura is not really strictly applicable to any other farm, even in the Waikato. In the end every farmer must work out his own method of applying the results of research. As long as the work of the Animal Research Division is concentrated on elucidating the basic principles of animal production its findings will be capable of application by any farmer no matter where he may be. It is for this reason that the contributions of the Animal Research Division are being so closely watched and followed by overseas farming countries.

Localised and District Problems

While the Division has been thus organised to handle all basic problems of animal disease and husbandry, a mechanism has been developed for handling important local problems found only in more or less restricted districts or on specialised soil types. Small specialist research "outposts" are established as and when required. An example is research into facial eczema of sheep. As this disease cannot be studied when it does not occur, the Manutuke Research Station has been established to meet the position. All the field work is done here in a district where facial eczema occurs regularly. The basic pathological and chemical work only is carried out at Wallaceville and Ruakura, where there are the necessary specialists. The Ruakura Hill Country Research Station is a further example. The problems of hill-country sheep and cattle production can hardly be examined on good lowland country. The recent purchase of a badly deteriorated hill-country property at Whatawhata will cover a long-neglected field of animal production in New Zealand. Ultimately the welfare of the lowland fattening areas depends upon the hill-country breeding areas. I believe that this new development promises to be of great importance to New Zealand agriculture.

Extension of Research

Research is of little value to the farmer unless it is taken to him and applied by him. The research men of the Division have little time or opportunity to pass on their important contributions direct to the farmer. This is done mainly through the extension services of the Department. Officers of the Livestock Division and Extension Division keep in close touch with all animal research work and in consequence can supply farmers with the latest information on any phase. Direct connection between the farmer and the research worker, however, is possible on a limited basis. The Ruakura farmers' week and the field days at both Stations provide an opportunity for free and open discussion of problems. Arrangements have also been made to provide films of the more important phases of the work.

—K. J. HOLYOAKE, Minister of Agriculture.

CARE OF LIVESTOCK DURING OCTOBER

Contributed by the Animal Research Division.

CATTLE TICK CONTROL

WHERE cattle ticks are plentiful spraying or dipping should be carried out in November and December to prevent tick worry and to kill the adult female ticks before they lay their eggs.

* * *

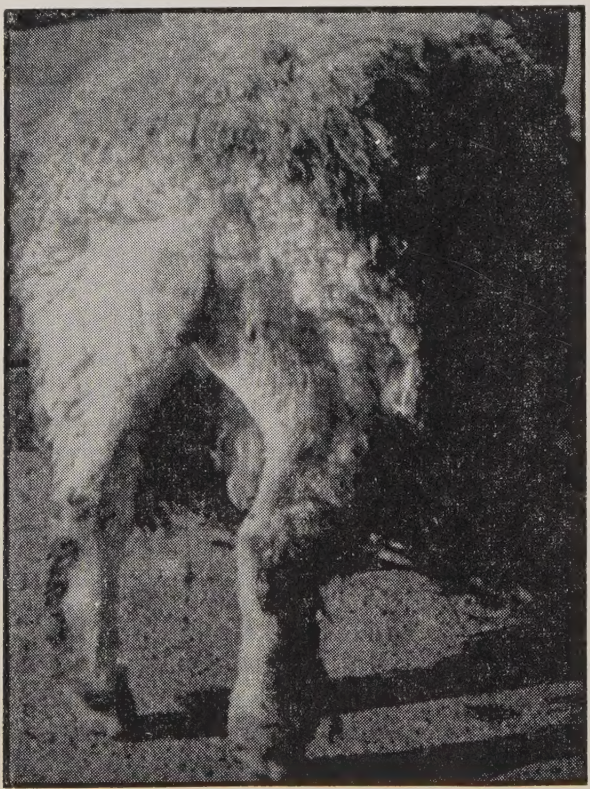
BLACK DISEASE VACCINATION

In the east coast areas of the North Island where black disease of sheep occurs vaccination should be carried out during November or early December. This will give protection against the disease, which occurs mainly in summer and autumn. Vaccine should be ordered immediately.

* * *

BLOWFLY STRIKE IN EWES

In districts where crutch strike causes trouble in ewes crutching or early shearing is advised. Close supervision is necessary to detect cases so that suitable treatment can be applied before the strike becomes too extensive. When treating cases of fly strike shear the wool away to leave an inch margin of clean skin around the the affected area. Remove the maggots by tapping with the shears, and apply some reliable non-irritant dressing. Irritant fluids such as kerosene tend to cause re-strike.



BLOOD POISONING AFTER SHEARING

Deaths of sheep after shearing may be due to infection with the blackleg germ of cuts or bruises. The disease can be prevented by vaccinating at least 3 weeks before shearing. Before buying the vaccine discuss the matter with a Veterinarian or Inspector of Stock and thus be sure blackleg has been the cause of the losses.

* * *

BLACKHEAD IN POULTRY

Blackhead affects young turkeys and poultry and the disease can best be prevented by rearing the birds on land which has not been contaminated by adult poultry. If an outbreak occurs, kill all affected birds and move the remainder to clean ground. In the event of a bad outbreak the local Poultry Instructor should be consulted, as in some cases treatment may prove beneficial.

* * *

GREENLEG IN BROODER CHICKS

Greenleg occurs in poorly ventilated brooders, especially if they are overcrowded and damp. At the first sign of trouble ensure that ventilation is adequate and that the litter is changed if it is damp.

* * *

ROUND WORMS IN POULTRY

Infestation by round worms is one of the most important causes of poor development of young birds. All growing stock should be treated twice with carbon tetrachloride, once at 3 months old and again at 5 months.

* * *

SUPPLEMENTARY FEED

Supplementary feed is essential to ensure the proper feeding of cows in winter and in dry summers and to control facial eczema in autumn. As soon as more pasture is available than is necessary to meet the immediate needs of stock the balance should be shut up for silage or hay. On a well-managed dairy farm it should be possible to shut up at least 40 per cent. of the pasture. Crop growing for fattening of weaned lambs is standard practice in South Island districts, and it could with advantage be adopted more widely in North Island districts which experience a dry summer. Crops such as thousand-headed kale and turnips in addition to providing excellent fattening feed for lambs are a splendid insurance against facial eczema. In Poverty Bay and Hawkes Bay they should be sown before the end of October so that they can be well established before dry weather sets in.

HEADING PHOTOGRAPH: Yarding ewes and lambs in temporary yards before docking the lambs. National Publicity Studios photo.

Methods of Marking Lambs and Precautions to be Observed

By A. D. M. G. LAING, Assistant Director, Livestock Division,
Department of Agriculture, Wellington.

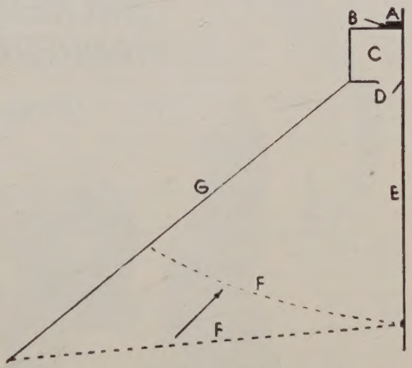
THE marking of lambs on a sheep farm is an important annual operation and unsound methods or any relaxation in the usual precautions can cause substantial loss. This article summarises methods in use at present and makes suggestions for minimising losses. It is emphasised that practical instruction from experienced operators in all lamb-marking operations is essential, and knowledge gained from literature can never eliminate the necessity for such instruction.

LAMB marking consists of three different operations: The placing of a distinguishing mark in one or both ears, the amputation of tails, and the castration of male lambs. The order in which the operations are done is immaterial and is suited to the convenience of the owner, but it is desirable, for obvious reasons, that double catching should be avoided and that lambs should be returned to their mothers as quickly as possible; for these reasons everything necessary is carried out in succession on each lamb.

Lambs are usually marked at between 1 to 6 weeks of age; 3 weeks is probably the ideal age. Systems vary according to the type of farm; for example, on high-country properties only one mustering will be convenient for this purpose. It should be remembered that the double operation, triple in the case of male lambs, is a strain on a young weakly lamb and lambs should not be marked when very young.

Preliminary Arrangements

Lamb-marking operations, even on quite a small scale, must be carefully organised. It is essential that clean yards should be used. If the sheep-yards have concrete floors, very thorough washing down will make them suitable. On most properties, however, a convenient and clean part of the paddock where the ewes and lambs are running is selected and temporary catching yards are put up. Hurdles and wire netting are suitable materials.



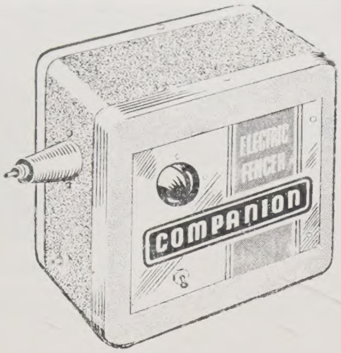
Temporary yard to hold about 250 ewes and lambs. A—Position where operator stands. B—Plank for resting lambs on. C—15ft. x 15ft. catching pen made of hurdles. D—Gate. E—Permanent fence, which should be netted temporarily. F—Wire netting closed in behind sheep; it is attached to the permanent fence (E) 54ft. from the gate (D). G—Temporary fence of wire netting.

A diagram of such a temporary yard is shown below. The board used for resting the rump of the lamb on when operating must be clean, and the use of a new piece of planking for this purpose is justified; 6in. is a good width. The board should be washed down frequently while operations are in progress.

It is important to choose a suitable day for docking operations. In very hot weather there may be trouble from fly strike and, if the causative organism (*Erysipelothrix rhusiopathiae*) of arthritis or swollen joint exists on the farm, cold, windy weather may cause cases of this trouble in the lambs operated on, because of their lowered resistance to germ infection.

So that lamb marking can begin reasonably early in the morning ewes and lambs should be mustered the day before. It is important that marking should be completed by early afternoon so that all lambs can be properly mothered up before nightfall.

Careful attention must also be given to all instruments which are to be used in lamb-marking operations. These should be thoroughly cleaned, boiled for at least 10 minutes in water in which 5 per cent. of washing soda has been dissolved, and then wrapped in clean cloths. Clasp knives, which have numerous crevices where dirt may collect, are quite unsuitable, and a one-piece knife of suitable size should be used. It should be sharpened before it is sterilised. These remarks also apply to any special-shaped ear-marking pliers which may be used, as there have been instances of infection from dirty instruments of this type.



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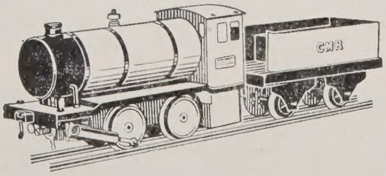

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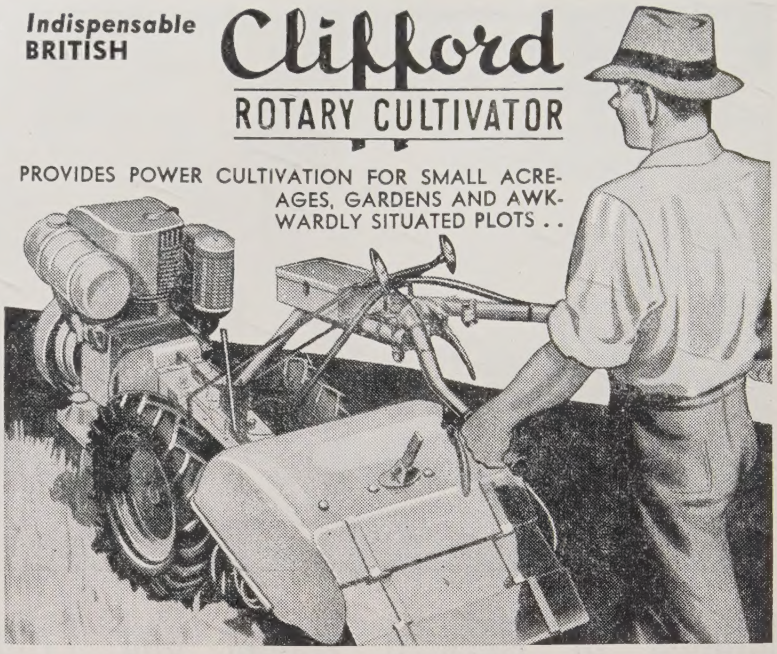

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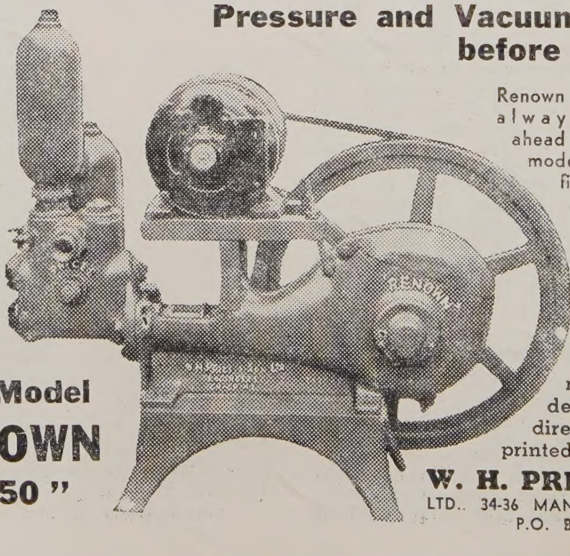

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A clean box, up-ended to hold the instruments and antiseptic, should be placed at a convenient point beside the plank on which the lambs will be rested when being marked. It is sound practice to cover this with a clean towel or old piece of sheet. A small basin filled with methylated spirits should be available and in this all instruments used should be placed when not in the operator's hand. It is desirable to apply antiseptic to the operation wounds, and it is far better to use a small pressure oil can which has been sterilised to squirt on antiseptic than to employ swabs, which rapidly become fouled.

The operator and catchers should wear reasonably clean clothing or sacking overalls.

Catching and Holding

Lambs should be caught as gently as possible and around the body. The use of some form of suitably sized shepherd's crook may help to prevent rough handling, as with it the lamb can be caught from behind in front of the chest. Swollen joints, bruising, or even dislocations may easily result if lambs are caught by the legs.

The catcher places the lamb with its rump on the plank which has been erected across one end of the catching pen, and its back against his body, with the fore and hind legs on either side held together. This allows complete control of the lamb with a minimum of force and leaves the parts to be operated on, the ears, the tail, and the purse, within easy reach of the operator.

Earmarking

It is probably best to do earmarking first, as it is less drastic than the other two operations.

An earmark, or a metal clip affixed to the ear, is defined as a "brand" within the meaning of Section 61 of the Stock Act, 1908, in which an earmark is described as: "An earmark distinctly and plainly made by cutting, splitting, or punching the ear, but so that in no case shall more than one-fourth of the ear be removed". It is obligatory under Sections 61 and 62 of this Act that all lambs shall be branded before April 30 in each year, though it is obviously more convenient and suitable to do this work a few weeks after the lambs are born.

Earmarking is carried out with special pliers and with the usual reasonable antiseptic precautions. If ear tags are used, they should be inserted half-way along the ear with the tag hanging down. It is desirable to use antiseptic solution on the site before and after the operation.

Docking or Amputation of the Tail

The tail should be amputated level with the lower tip of the vulva (the external genital orifice) in the case of female lambs, and a stump of the same length should be left in male lambs. It is immaterial whether the cut is made at a joint or through one of the tail vertebral bones. The younger the lamb is at docking, however, the more rapidly will the wound heal.

There are three common methods of docking tails: By using the knife, the searing iron, or the rubber ring.

[*National Publicity Studios photo.*

Earmarking. Note that the lamb is gripped by the body so that the head can be controlled better and injury to joints by struggling avoided.

Use of Knife

Docking by use of the knife is the recommended method, and a one-piece, easily sterilised knife should be used.

The operator holds the tail in one hand, squirts antiseptic solution on the place where the cut will be made, presses the skin upward toward the body, and with a clean, sharp cut with the knife severs the tail. The object of pushing the skin back is to allow for more satisfactory healing and prevent protrusion of the cut bone. The tail may also be bent with the tip toward the lamb's body and cut through at the bend by the operator drawing the knife toward him. This method leaves an overlapping flap of skin which is stated to assist healing. When the operation has been completed some antiseptic should be squirted into the wound.

On many farms it is customary to place the ewe lamb tails in one heap and the wether tails in another to make counting easy.

Docking by Searing Iron

Docking by the searing iron is quite efficient if carefully carried out, when it appears to prevent unfortunate sequels such as arthritis infection (inflamed joints). It is, however, inconvenient, and operators must be thoroughly experienced in the method.

The procedure is similar to that for amputating the tail with a knife, but the tail must be held quite straight and never folded. The searing or docking iron must be at "black heat", not red hot. It is impossible to describe the correct degree of heat and it can be learnt only by experience. Four, six, or more searing irons are necessary and a small brazier for the fire is preferable. Searing irons with internal heating by methylated spirits are available.

The searing iron is pressed lightly on the tail at the desired point, the skin being pressed toward the body as in the knife method, and with gentle pressure the whole structure is seared through. There is no haemorrhage, a light scab will form over the wound, and healing will be fairly rapid. If the iron is too hot, however, tissue damage will be considerable and pus will form under a thick scab. A purulent wound of this nature may result in death from septic poisoning or tetanus. Therefore, though the searing iron method of docking can give very good results and is, in good hands, excellent on arthritis-infected farms, it leaves little or no margin for error.

Antiseptic should be used both before and after the operation.

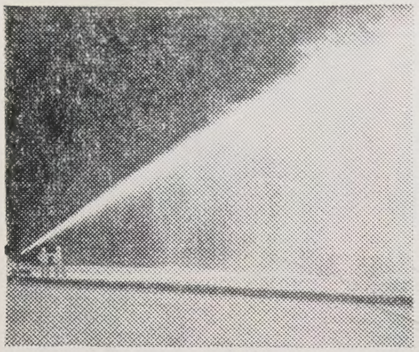
Docking by Rubber Rings

The use of small rubber rings, made in different sizes and put on the tail at the point desired for amputation, has increased greatly. The skin should be pressed toward the body as with the other methods, and the rings should, if possible, be placed over a joint, though this is not easy. After some days the stoppage of circulation of blood results in gangrene, and the decayed portion of the tail drops off.

An open, ragged, dirty wound is left, and in areas where tetanus infection exists there have been fairly heavy losses from this disease in lambs of all ages docked by this method. From a surgical point of view amputation by ligature of a portion of the animal body with a bony core is not a sound procedure.

Castration of Male Lambs

Castration is effected by the removal or destruction of the testicles. The knife, one of the types of instruments



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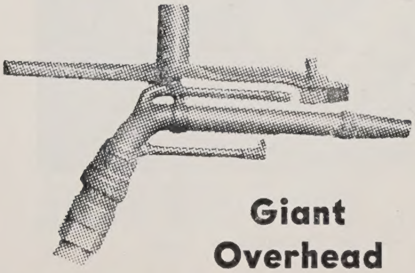

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known as bloodless emasculators, or rubber rings may be used.

Whatever method is used, the lamb should be held as described in the section on docking, and castration should be the final operation of the three necessary for male lambs.

Use of Knife

Antiseptic should be applied freely to the site both before and after the operation.

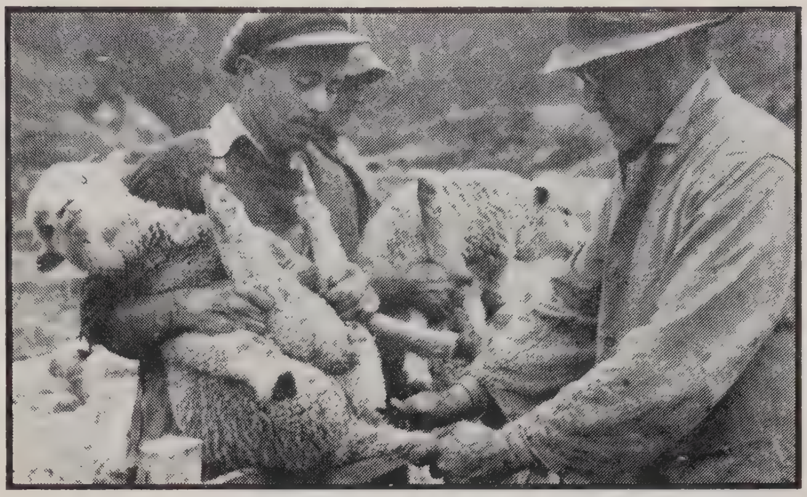
The tip of the purse should be held in one hand and the lower third either cut off completely or slit by a free incision from front to back. Either method should give that free drainage from the site of the operation which is so essential to healthy healing. The testicles may now be forced out of the slit in the purse by gentle pressure from above. Many farmers still use the old-fashioned method of grasping the testicle with the teeth to pull it out. Specially designed forceps of several types are also available for this purpose and these can be kept with the knife in the methylated spirits basin placed beside the operator. The withdrawal of the testicles must be done gently and no risk must be taken of breaking the cord internally.

The knife may be used to scrape through the cord, but special emasculating pincers which cut and crush the cord and reduce haemorrhage are recommended. The pincers must also be kept in the methylated spirits basin when not in use.

Animals with only one testicle in the purse should be suitably marked for early disposal, as they are rigs and will develop male characteristics.

Emasculators or Bloodless Castrators

Several types of emasculators or bloodless castrators are available. They work on the principle that, owing to the difference in the structure and elasticity of the skin and the structures forming the cord, it is possible with the jaws of a very carefully constructed and adjusted pair of pincers to sever the cord without more than lightly crushing the skin within which it lies.



[National Publicity Studios photo.

A lamb correctly held for docking.

All points mentioned about castration with the knife, including the use of antiseptics, apply to the use of emasculators. Users should note, however, that crushed skin is less resistant to infection than a clean wound with good drainage.

Points to remember are:—

1. See that the jaws close on the cord well away from the testicles; that is, up the neck of the purse toward the abdomen. If the testicle is crushed, then trouble will ensue, abscess formation or even death resulting.

2. See that the cord does not slip out of the jaws of the instrument as they close. The fingers and thumb of the free hand may be used for this. It is a good plan when the jaws are closed very gently to push the severed end of the cord up and away. The jaws of the instrument should be kept closed for the period advised by the makers. If there is doubt about the operation being satisfactory or if lambs are older than the usual age for castration, the cord may be crushed a second time higher up.

Do not neglect to swab antiseptic solution on the crushed skin after completing the operation.

There may be some swelling of one or both testicles, but it soon subsides and the organs wither away.

Rubber Rings

Castration by ligation, that is a tight ligature or clam around the testicles, has been practised from very ancient times. The rubber ring placed around the neck of the lamb's scrotum or purse is a modern adaptation of this method.

General points are the same as for the two previous methods and the use of antiseptics to counter the crushing and irritation of the skin which ensue must not be neglected. The purse eventually drops off.

One drawback to this method is the extent to which lambs on which it is used rub the ligated part on the soil with resultant dirt contamination.

With both the bloodless emasculator and the rubber ring methods of castration there can be no doubt that more care should be taken, on some properties at least, than there is at present.

At one meat export works during the past season 8 per cent. of wether lambs were classed as stags; that is, as imperfectly castrated. When emasculators are used imperfect castration is due to one cord slipping and being imperfectly crushed. When rubber rings are used for castration care must be taken that **both** testicles are well below the rubber ring when it is closed. If one or both are not, then sufficient testicular tissue will be left functioning to create a "staggy" carcass, and very considerable unnecessary pain will be caused to the lamb.

The attention of all sheep farmers is drawn to the fact that complaints about the proportion of "staggy" New Zealand wether lamb carcasses have been received recently from the United Kingdom.

[National Publicity Studios photo.

Lambs should be returned to their mothers as soon as possible after docking.

METHODS OF MARKING LAMBS . . .

Procedure after Lamb Marking

Care after marking is by no means the least important part of the operation. Important points are:—

1. The lamb must be placed very gently on its feet on the ground. As far as possible the wounded parts should not become soiled.
2. The ewes should be kept handy to the docking yard and the lambs allowed to them as soon as possible for a drink of milk. A long run to the ewe should be avoided, as this may increase bleeding.
3. Do not move the ewes until all the lambs have mothered.
4. When returning a mob of ewes with freshly marked lambs to their paddock be particularly careful to take them along very slowly and quietly.

Possible Troublesome Sequels to Lamb Marking

Arthritis or swollen inflamed joints: These are due to infection gaining entrance into a wound, and harsh weather conditions undoubtedly play a part by lowering body resistance. The type of inflammation with heat and pain but relatively little swelling passes fairly quickly and most cases, apart from those which have setbacks, recover uneventfully. Where there is pus formation and swollen joints a wasted limb or limbs and consequent rejection for export on slaughter may ensue.

Proper antiseptic precautions and other measures already outlined, will prevent the trouble. Penicillin treatment in the very early stages of arthritis, if economically justified, will give good results.

Acute septic poisoning and/or blackleg: Symptoms are sudden death occurring in 1 to 4 days after marking. This trouble is due to a breakdown in the cleanliness of the marking procedure, use of dirty ground for the docking yards, etc.

It can be prevented by careful attention to all precautions and, if the farm is badly contaminated, by the use of a preventive vaccine on the ewes about 3 weeks before they are due to lamb and the carrying out of marking of lambs as soon as possible after birth. The advisability of such vaccinations should always be discussed first with a veterinary surgeon or a field officer of the Livestock Division, Department of Agriculture.

Tetanus or lockjaw: The lamb becomes rigid, lies flat, and is in great pain. The symptoms appear 1 to 9 days after infection. If lambs are approached or touched, their rigidity increases. The head may be bent right back. Humanity dictates immediate slaughter, as the pain is intense.

Docking methods such as the use of rubber rings should be avoided in areas where tetanus infection is known to exist. If it is considered essential to use rubber rings for docking in tetanus areas and tetanus cases occur, swabbing out of the dirty wounds where the tails have dropped off with hydrogen peroxide, the oxygen of which is effective against the tetanus germ, may help to prevent further cases. It must be emphasised that as long as there is an open, dirty wound, infection may take place; tetanus cases can and do occur in the circumstances described weeks after marking has taken place. Tetanus symptoms appear 1 to 10 days after the tetanus germ has gained entrance. They are due to a poison or toxin produced by the germ, which affects the nerves, producing muscle convulsions. If it is economically worth while, inoculation can efficiently prevent tetanus infection.

Antiseptics for Use at Lamb Marking

Methylated spirits, pure or diluted with one quarter of its bulk of boiled water, is an excellent antiseptic, as are the antiseptics known as the quaternary ammonium group. Hydrogen peroxide, diluted with 2 or 3 parts of boiled water, is also excellent for wounds. There are, too, many excellent proprietary preparations available.

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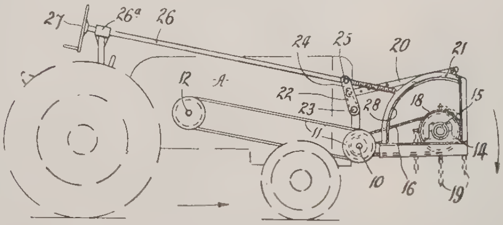
Recent Patent Specifications for Farming Inventions

The following particulars of recent patent specifications of interest to farmers have been selected from the Patent Office Journal issued on June 20, 1950, and are published by permission of the Commissioner of Patents, Wellington. Photostat copies of any specification will be supplied for a small fee on application to the Patent Office.

No.	Description.	Applicant.
97692	Scrub-cutter Attachment for Tractor,	W. R. Clough.



[Only those references which are necessary to an understanding of the specification are quoted in the abridgment below.]

To clear land of scrub, brush, lupins, or the like, a rotatable drum is disposed transversely in front of the tractor, carrying on its periphery cutter or beater members which will be flung outward on rotation of the drum and beat down or cut any scrub and the like in the path of the tractor. The machine comprises—in combination with a tractor A—a driving shaft 10 located transversely in front of the tractor, driven by belt and pulley arrangement 11 from pulley 12, a frame 14 extending further out and carrying a shaft 15, the latter being geared by chain and sprocket 16 from driving shaft 10. On shaft 15 a drum 18 is mounted with beater members 19—such as chains—loosely hinged to the periphery of drum 18. The height adjustment of the drum in relation to the ground is effected by thrust rod 26, acting on link arrangement 20 to 25, operable from the driver's seat by manipulating wheel 27. Cover 28 protects tractor and driver from severed pieces of material. Beaters 19 are preferably arranged in staggered formation.

90415	Continuous Process for the Manufacture of Salted Butter,	Aktiebolaget Separator.
94697	Process and Apparatus for Milk Evaporation and Canning,	Food Machinery Corporation.
96131	Milk Fat and Buttermaking Process,	Kraft Foods Corp.
96788	Earthworking and Loading Equipment Attachable to Front or Rear of a Tractor,	C. W. F. Hamilton and Co., Ltd.
99636	Rotary Water Sprayer,	Sigmund Pump Ltd.
100042	Fencepost-erecting Means,	A. S. McGregor.

Radio Broadcasts

THE following talks will be given to farmers from Station 1YA Auckland at 7.15 p.m.:—

October 4—"Uncommon Vegetables for the Warmer Districts," by J. T. McConachie, Horticultural Inspector, Department of Agriculture, Auckland.

October 11—"Kikuyu Grass," by E. H. Arnold, Assistant Fields Superintendent, Department of Agriculture, Auckland.

October 18—"The Department of Agriculture's Service to Country Women," by E. E. A. Topping, Rural Sociologist, Department of Agriculture, Auckland.

October 25—"Young Farmers' Clubs," talk arranged by Te Awamutu District Committee, New Zealand Federation of Young Farmers' Clubs.

Radio talks will be given to farmers from Station 1XH Hamilton at 7.30 p.m. as follows:—

October 5—"Supplementary Crops for the Dairy Herd," by J. R. Murray and H. M. Bull, Instructors in Agriculture, Department of Agriculture, Hamilton.

October 12—"Tuberculosis in Cattle," by D. W. Caldwell, Veterinarian, Department of Agriculture, Hamilton.

October 19—"Even a Worm will Turn" (Environmental requirements and effects of earthworms), by R. L. Nielson, Soil Biologist, Soil Research Station, Hamilton.

October 26—"Haymaking," by A. J. Price, Fields Instructor, Department of Agriculture, Te Awamutu.

The following talks to farmers will be broadcast from Station 1YZ Rotorua at 7.15 p.m.:—

October 12—"Current Farming Problems," by C. R. Taylor, Fields Instructor, Department of Agriculture, Rotorua.

Other talks are given from 1YA Auckland on Tuesdays at 12.35 p.m., 2YZ Napier on Tuesdays at 7.10 p.m., 2YA Wellington on Thursdays at 12.35 p.m., and 3YA Christchurch on Mondays at 12.20 p.m.

Pig Broadcasts

Under the auspices of District Pig Councils broadcasts will be delivered as follows:—

Whangarei—1XN, on October 2 and 4 at 7.30 p.m., "Avoiding Losses in Pig Production," by J. Wheeler, Supervisor, Northland District Pig Council.

Auckland—1YA, on October 17, at 12.35 p.m., "The Overfat Pig is not Wanted," a discussion with a bacon curer and grocer, conducted by H. E. Clark, Supervisor, Auckland District Pig Council.

Napier—2YZ, on October 11, at 7 p.m., "Housing for Pigs," by H. T. Donaldson, Supervisor, Tairawhiti District Pig Council.

Palmerston North—2ZA, on October 20, at 7 p.m., "Farrowing House Design," by L. L. Marsdon, Supervisor, Wellington District Pig Council.

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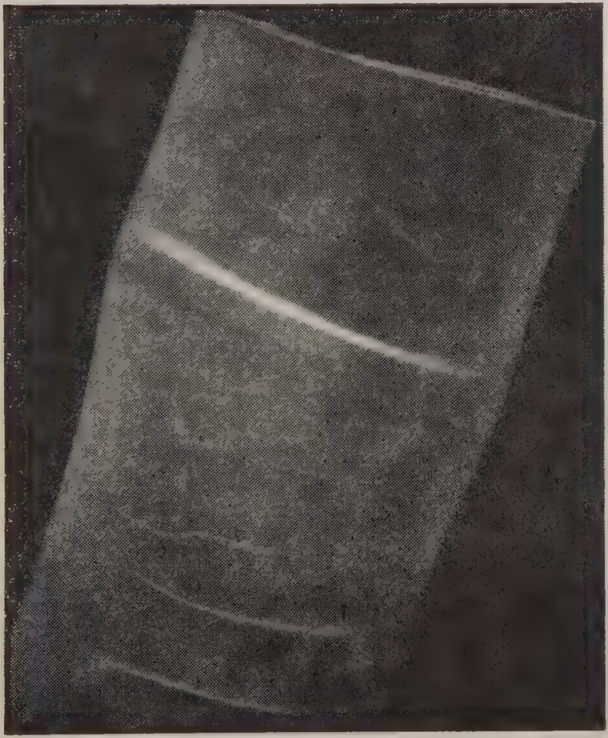
Transparent Plastic Tubing Found Unsuitable for Milking Machines

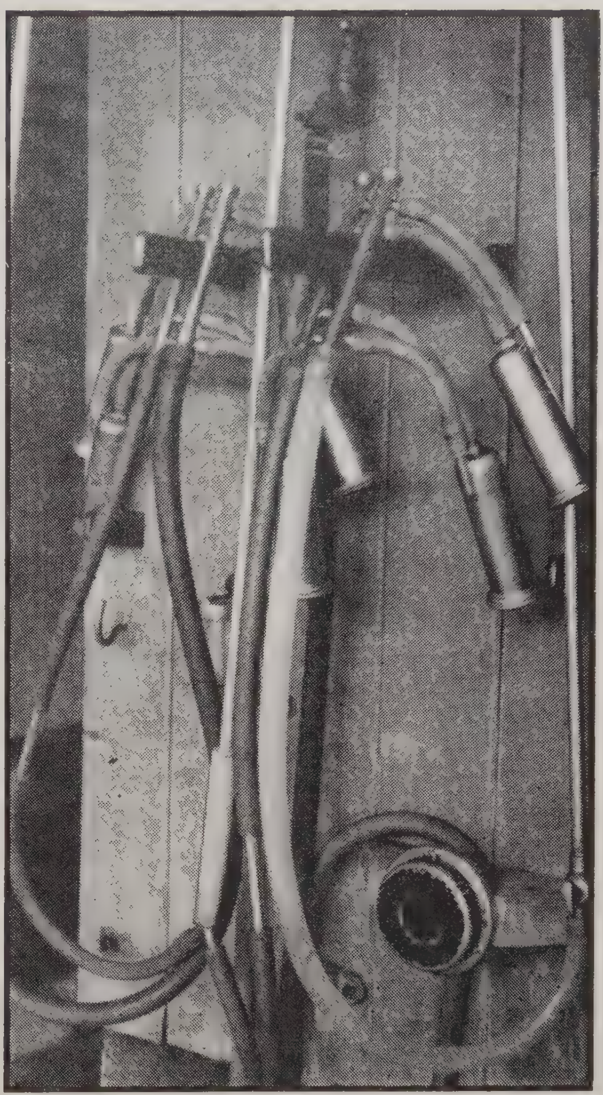
POSSIBILITIES resulting from the use of clear plastic tubing in place of rubber tubing on milking machines have aroused considerable interest. Results of trials carried out in New Zealand are the basis of this article by W. G. Batt, Supervisor of Farm Dairy Instruction, Hamilton, and W. G. Whittleston, Physical Chemist, Ruakura Animal Research Station, both of the Department of Agriculture. Their conclusions, which are supported by experience in Great Britain and America, are that the disadvantages of the plastic tubing outweigh its advantages and that the type of tubing tested is not suited for use on milking machines.

DURING the past dairying season several milking-machine companies sought an opinion about the suitability of transparent plastic tubing for the conveyance of milk between the teat cups and metal droppers of milking machines. The companies concerned had in mind that such transparent tubing would make a satisfactory substitute for long rubbers in particular, and it was suggested that it would have the advantage of allowing the milk to be visible.

To provide reliable data trials were begun under practical conditions on a Waikato dairy farm and at Ruakura Animal Research Station. In both trials lengths of English-manufactured, transparent, plastic tubing made of poly vinyl chloride (P.V.C.) were fitted and were cleaned by the boiling water-caustic soda method once daily and with boiling water after the evening milkings. At Ruakura 12 cows per set of cups per milking were handled and on the dairy farm 9 cows. Results of the tests may be summarised as follows:—



Cracks in the end of the plastic tube.



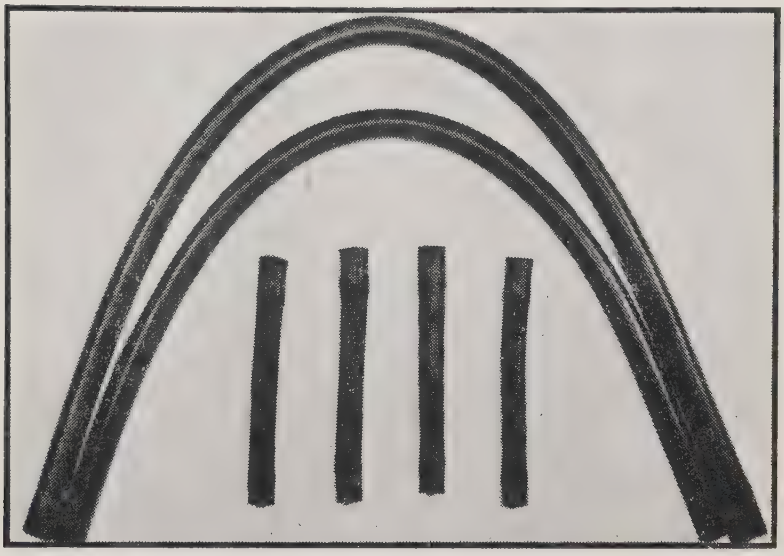
The plastic tubing on the machine during test. It has assumed a milky appearance and cracks have appeared at the end where it meets the claw.

Dairy farm: The duration of the test was 17 weeks. The main faults shown were: Principally, the appearance changed from transparent to white, making the tube almost opaque; the tubing was stiff and not as easy to handle as rubber; and the rigid nature of the plastic tubing became more pronounced with increasing cold and tended to place a side pull on the teat cups during milking.

Ruakura: The duration of the test was 20 weeks. The main faults shown were: The tube became distinctly milky in appearance, the transparency being reduced considerably; cracks developed both inside and outside where the tube joined the claw; and the end which was put on and taken off the machine became eroded.

The trials confirm the claim that plastic tubing is more fat resistant than rubber, but the plastic has disadvantages in other respects, the two most prominent being its progressive change of colour and its rigidity in cold weather.

PLASTIC AND RUBBER MILKING TUBES



Carbon-black rubber milk and claw tubes after 3 years' use.

Colour, Smell, and Flexibility

The change in appearance was most pronounced. During the dairy-farm trial a colour change to "cloudiness" first appeared in 2 weeks and became progressively more marked until the tubing became completely white and opaque within 16 weeks. This colour change, which may be caused by the action of milk on the plastic as well as by the action of alkalis, removes the possibility of such tubing providing visible milking. In fact, if it is used for this purpose, it is likely to have the unsatisfactory effect of giving a false impression of the end of the milk flow.

Another unsatisfactory feature was the development of a strong, unclean smell on the inside of the tubes after they had been held for a week after their removal from the machine. This suggests that bacteria were harboured under the deposits.

Flexibility is one of the advantages of rubber when it is used between the teat cups and metal droppers. The plastic substitutes are reasonably flexible when warm, but become progressively more rigid as cold increases. In cold weather and on cold mornings the rigidity of the tubing causes an unsatisfactory side pull on the teat cups during milking.

The trials indicate that, though this plastic tubing has advantages over rubber because of its fat resistance, it is unlikely to prove a satisfactory substitute because of the reaction of the material to milk and alkalis. The rapid colour changes preclude the possibility of its providing an aid to visible milking. It is quite apparent that this type of P.V.C. tubing is not suited for use on milking machines.

The fact that it may mislead the farmer about the end of milking is a further objection to the use of any transparent tube in place of a milk rubber. A slow trickle of milk after normal machine milking is characteristic of many cows. This is evident in a transparent tube, and the cautious farmer is likely to leave the cups on for a minute or two too long to get the last drop. By using an accurate sight glass in series with the plastic tube it was found at Ruakura that the impression of flow of milk in the tube was quite misleading.

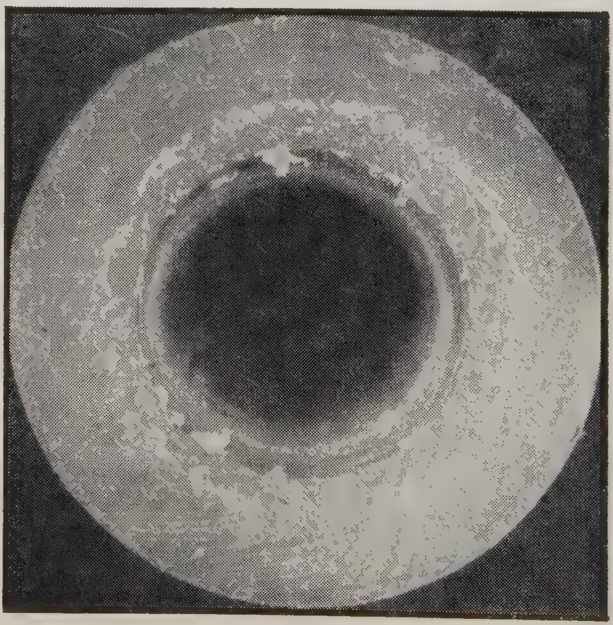
Transparent plastic milk tubes came into use in both America and Great Britain about 2 years ago, but already they are rapidly going out of favour. The objections are essentially the same as the New Zealand tests have demonstrated—the tubing becomes more or less opaque in use; it tends to crack when bent; in cold weather it becomes stiff and causes the teat cups to fall off; being transparent for part of its life, it tends to mislead the farmer about the end of milking; and it is more expensive than rubber.

Carbon-black Rubber Tubes

The present interest in plastic tubing is because of its transparency, and dissatisfaction with the quality of some rubber tubing available may be responsible for an endeavour to find a substitute. Work at the Wallaceville Animal Research Station during the war showed that the life of rubber tubes, and particularly claw tubes, could be extended greatly by the use of carbon-black as a filler. Samples of carbon-black rubber tubing were made by a local firm and tested on a number of dairy farms as well as being subjected to laboratory bending and fat-absorption tests. In most respects the carbon-black tubes were better than those containing the normal fillers. At the time of these tests normal claw tubes were found to crack and become useless in 3 to 6 months. In no case did a carbon-black tube fail in less than 1 year, and most of the carbon-black claw tubes lasted 3 years. The sheds in which the tests were performed were producing milk for town supply and so milked all the year round. The standards of shed hygiene were excellent, with twice a day caustic soda cleaning and a general high level of cleanliness. This helped greatly to prolong the life of the rubberware, but it applied to both kinds of rubber.

Carbon-black rubber is more expensive than normal milking-machine rubber, but even if it were half as dear again, it would still be a bargain, and certainly it is better than any plastic tubing tried so far. New Zealand experience is borne out by that of the largest maker of milking machines in the United States; this firm uses only carbon-black rubber for milker rubberware.

If New Zealand farmers want a better-quality milker rubber, they must persuade local manufacturers to make a suitable grade of carbon-black rubber. No synthetic plastic known at present has as good qualities as a carefully compounded rubber for use as milking-machine tubing.



The plastic material was eroded where the tube was put on and taken off the metal connecting tube.

BEEKEEPING IN TARANAKI

By L. H. JOHNSON, Apiary Instructor, Department of Agriculture, Palmerston North.

ALONG with the development of dairy and sheep farming on the grassy plains surrounding Mt. Egmont in Taranaki came the growth and expansion of the beekeeping industry. Although some of the pioneer commercial beekeepers who are still active in the occupation began beekeeping as early as 1909, it was not until Mr. W. F. Lenz brought 400 colonies of bees to south Taranaki in 1914 that several men were encouraged to extend their hive holdings to a full-time occupation and as a sole means of livelihood.

A MEETING was convened at Hawera in 1908 for the purpose of forming a beekeepers' association. The newly formed South Taranaki Beekeepers' Association began with a membership of 21 beekeepers. At the end of a year the number had increased to 30 and continued to multiply until the second year, when the association had the largest membership in the Dominion. In 1914 the association joined the National Federated Beekeepers' Association of New Zealand.

Organised Marketing

Some of the credit for organised marketing also appears to be due to the efforts of south Taranaki beekeepers in forming in 1913 the New Zealand Honey Producers' Association with a capital of £3000. With the establishment of the association the first advance payment for honey was 3½d. per pound.

Expansion of Commercial Beekeeping

These co-operative movements were a stimulus that attracted more men to the industry. After the First World War several returned servicemen took up beekeeping as an occupation and have continued until the present.

At least two men started each with a capital of £100 and succeeded in building up to full commercial status without borrowing money. Commercial apiaries were soon established in all the 10 counties surrounding the mountain. A large part of the province is in grass, not much cropping being done, and on these grassy plains are located 346 apiaries containing 10,140 hives, an average of nearly 30 hives per apiary. There are 15 full-time commercial beekeepers and another 7 apiarists owning over 100 hives in the province. The area worked by each commercial beekeeper is approximately three-quarters of a county. Though no new areas have been taken up by beekeepers in recent years, the steady increase in the hive holdings of already established beekeepers will probably continue for a long time. The territory is by no means fully stocked with bees, although there are no unoccupied areas of sufficient extent to support a 400-hive outfit without some encroachment on the areas at present worked.

The logical conclusion is that because of land development, more pockets of good territory will become available and the industry must continue to expand.

Climatic Conditions

The climate of Taranaki is largely governed by the mountain and the altitude above sea level. There is a very great difference in rainfall and temperature between areas near the sea coast and on the central upland. Westerly winds sweep in from the sea and because of the rise of the land, shelter is effective only for a very limited distance. Very heavy losses of field bees during spring are caused by these almost-incessant strong winds. The north-east side of the mountain appears to be much better sheltered. The spring is cold and changeable with short periods of fine weather between rains. Periods of rainfall continue through the summer and spells of consecutive warm sunny days are of comparatively short duration. Weather conditions may be general or local; rain may be falling at Stratford while New Plymouth on the other side of the mountain may have sunshine. Droughts comparable with those of Hawkes Bay are unknown in Taranaki.

Topography

Both the climate and topography of Taranaki are unusual. The plains rise from approximately 100ft. at the sea coast to 2000ft. at the edge of the mountain reserve. Numerous streams which have their sources in the mountain radiate from it like the spokes of a wheel. Although there are times when prolonged heavy rain falls on the mountain, no general flooding of the countryside occurs owing to the

Boxthorn hedges used for shelter on the Waimate Plains.

quick get-away, so that there is no flood hazard for beehives. The soil is mainly a light volcanic ash which is fertile, sweet, and porous. It allows a quick response in growth to sudden warmer conditions.

A network of roads which are mainly tar sealed gives good access to nearly every part of the province.

Shelter

The lack of major shelter in south and south-west Taranaki has been due mainly to the devastating effects of the salt-laden winds from the sea. About 45 years ago Taranaki experienced one of these extreme winds, which burnt up practically all exotic shelter trees. An African boxthorn hedge (*Lycium ferocissimum*) growing near the main road at Riverdale which survived this storm demonstrated the suitability of this species for the coast.

Since then it has become very popular as a low shelter and impenetrable hedge and farmers have planted hundreds of miles of these hedges, plantings of the species far exceeding those in any other district in New Zealand. The greatest concentration of these dual-purpose hedges is in the Waimate West County. From about midway between Hawera and Eltham boxthorn hedges are replaced by barberry hedges (*Berberis vulgaris*), and these extend around the inland side of the mountain to within a few miles of the north-western coast. There are some well-established plantations of *Pinus radiata* and gum trees and some handsome clumps of native bush between Stratford and Waitara. Many shelter belts of *Pinus radiata* and macrocarpa have been planted in south-western Taranaki in recent years and the beneficial effects will be felt progressively by those keeping bees in this area.

Type of Equipment

Fortunately for Taranaki beekeepers the pioneers of the industry began with good well-made hives which were properly painted. Those who followed appear to have maintained this standard of quality. Every commercial beekeeper in the province has manufactured his own hive parts. Hives are almost universally set in pairs on two 3in. x 2in. runners which are fixed to four stout pegs driven into the ground. This set-up has much to commend it, as hives standing upright on an even foundation not only are testimony to the hand of the skilled workman but the supers are not likely to get out of alignment as do those in hives on the ground after settlement takes place; their combs also remain in proper shape.

Although a few beekeepers have in the past dipped hives in paraffin wax, practically every commercial apiarist today is using a lead and oil paint for apiary equipment. Much of the well-painted hive equipment made by the early beekeepers is still in service. Unsightly hives covered with tar and kerosene or motor sump oil are a rarity in Taranaki.

The majority of hives are made to the dimensions of the standard 10-framed hive, but a few beekeepers in south Taranaki have used a 12-frame hive for many years and they have developed a system of management applicable to the large hive. The departure from the Dominion standard does not appear to have given any over-all advantage and returns of honey per hive do not exceed those of neighbouring beekeepers using standard equipment. It is mainly a question of adjusting the system of management to suit the large hive.

Most of the honey houses are built on the gravity principle, although a few of the latest buildings are of the level-floor type with a honey pump installed. Beekeepers have not yet built such adjuncts to the handling of honey as a warming room, drying unit, or cooling compartment.

An apiary in the shelter of a boxthorn hedge.

Comb Foundation Manufacturing

In addition to honey-extracting equipment a beekeeper in south Taranaki installed a comb foundation manufacturing unit in 1909. In later years the older type of embossing rollers were replaced by root mills and these are still in operation. This factory can process ½ ton of comb foundation (8400 embossed sheets) per week. The usual demand is for 7½ sheets to the pound. Beekeepers in the district have been able to send in their bulk wax for conversion to comb foundation and thus effect considerable savings. Not only has this factory met the needs of the province, but it has also been of service to beekeepers in many other parts of the North Island.

Strain of Bees

Black bees were the original race and may still be found in large numbers in the more isolated districts of northern Taranaki. Beekeepers, especially in the districts surrounding Kaponga, have persistently bred pure Italian bees for many years without introducing new blood and have developed a very docile yet good honey-gathering strain equal to any in New Zealand. Taranaki bees have generally been bred to a high standard and possess most of the desirable qualities.

Hives in pairs on hive stands.

Beekeeping Methods

The adverse climate and the very limited natural source of nectar supply make it necessary for beekeepers to feed their bees very heavily, often into the early summer. In some seasons colonies have required as much as 1½ tons of artificial food per hundred hives to maintain them until the clover flow in December.

In recent years more use has been made of comb honey (mainly manuka) in place of sugar for feeding and it appears to be satisfactory. The damp winter atmosphere does not appear to have any detrimental effect on stored combs of honey.

Owing to sudden changes in the weather, supers must not be added much in advance of requirements. Another problem is the control of hive strength. Strong colonies may be in a condition conducive to swarming when a strong westerly wind will so deplete the hive of field bees that they would appear to have swarmed. On the other hand if the weather remains fairly calm, swarming is difficult to control. Possibly Taranaki beekeepers give their colonies more attention in spring than is necessary in other parts of the Dominion. Very little if any use has been made of modern hive-control methods such as the queen excluder, two-queen system, and escape boards. The lower altitudes near the coast should be quite suitable for at least some modification of these systems with the standard hive.

Another condition that the inexperienced man would not expect is that colonies located near the mountain, where the climate is rigorous with cold down draughts from the snow, will winter only in strong two-storeyed units.

Section of apiary containing 12-frame hives well sheltered by silver poplar trees.

Main Sources of Nectar Supply

Although there are many nectar-yielding plants, the main honey flow comes from white clover. Taranaki honey has a flavour peculiar to the province. This is mainly due to the soil type. In a favourable season the whole of the plains is carpeted with a white and green sward of clover. In contrast to the slower reaction of clovers on clay soils not more than 3 or 4 days of warm, sunny weather are required for the clover to react and freely secrete nectar on Taranaki soil.

Next in importance to clover is blackberry, which grows on waste places, on the banks of streams, and on the less developed lands of high altitude. The honey is greyish-white and has a distinctive and excellent blackberry flavour.

Other pasture sources are catsear, hawkweed, and *Lotus major*. Surplus honey is also secured from rewarewa, kamahi, and rata. Under favourable conditions boxthorn will also yield a surplus. When the weather has been dry the leaves of the boxthorn will fall; then a good downpour of rain will start a new growth, the flowers of which will often yield nectar heavily. The maximum that has been recorded from this source is 17lb. in 1 day during a late autumn flow. The honey is easy to extract, but has an unusual amount of moisture to be evaporated out. It granulates very smooth and makes an excellent starter. The colour is water white and the flavour is very acidy and inferior to that of clover honey. One season a beekeeper extracted 15 tons of this honey in May. Spring nectar is very limited in the pasture areas. A little is gathered from tree lucerne, willow, and barberry. The dandelion and scotch thistle, which were so common in Taranaki years ago, are now of little importance as nectar sources. Northern Taranaki honeys usually have a little more colour, but the flavours are excellent. The occurrence of buttercup, pennyroyal, and ragwort is negligible.

Honey Crop Returns

Honey producing in Taranaki is a somewhat precarious occupation. Seasonal returns fluctuate from very near total failure to occasional bumper crops. Failures are usually due to too much rain with low temperatures and on some occasions drying winds, especially near the coast. Men with many years of experience seem to have got about Dominion-average returns fairly consistently, but the less experienced do well to get 2 tons of honey per 100 hives. Taranaki may not be a high-production area for honey, but one redeeming feature is that the high-quality product will always sell.

Markets

Taranaki beekeepers can dispose of practically all their honey on the local market. Darker honeys from outside districts could not compete with the high-quality local product.

Boundaries

Almost every larger town in the province is the headquarters of a commercial beekeeper, but the apiaries are distributed over all the good clover pastures in the province. To avoid overstocking some areas and bypassing others beekeepers have by mutual agreement defined their boundaries so that each could establish apiaries in the territory nearest to his headquarters.

Foul-brood Situation

In the early days of beekeeping American foul-brood disease (*Bacillus larvae*) had got such a hold that 90 per cent. of apiaries were infected and it required a united effort by beekeepers to get it under control. Now the disease has been so effectively dealt with that only about 1 per cent. of the total hives have been infected each year. There are large areas in south Taranaki that have been completely free from foul-brood for the last 15 years and it is hoped that the vigilance of beekeepers will keep them so.

Acknowledgment: Acknowledgment is made to Messrs. H. E. Lloyd, H. R. Penny, and T. R. W. Nicholas for providing information on the early history of beekeeping in Taranaki.

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METEOROLOGICAL RECORDS FOR JULY

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit): Approx. mean	Difference from normal	Absolute maximum and minimum: Maximum	Minimum	Rainfall in inches: Total fall	No. of days of rain	Difference from normal	Maximum fall: Amount	Date	Bright sunshine hours
Kerikeri	201	52.4	+ 2.4	67.0	32.5	1.47	15		0.67	13	
Auckland	160	51.4	— 0.1	62.4	38.5	1.57	11	— 4.11	0.50	13	155.1
Tauranga	10	49.3	+ 0.9	62.9	31.2	3.96	9	— 1.10	2.14	1	171.3
Ruakura	131	46.4	— 0.4	62.0	23.3	2.39	9	— 2.45	0.56	13	145.6
Rotorua	980	45.9	+ 1.3	61.0	26.0	2.47	8	— 2.51	1.15	1	149.2
Gisborne	12	49.0	+ 1.4	65.6	33.9	7.18	17	+ 2.85	4.75	1	122.9
New Plymouth ..	160	49.0	+ 0.4	60.5	33.5	2.66	12	— 3.66	0.59	8	137.8
Napier	5	48.0	+ 1.2	64.9	28.1	3.07	11	— 0.48	2.27	1	152.1
Taihape	2157	41.2	— 0.2	57.0	26.6	3.38	12	+ 0.31	0.84	15	
Wanganui	72	47.3	+ 0.5	63.0	30.2	3.91	12	+ 0.65	1.33	14	139.4
Palmerston North	110	46.0	+ 0.5	61.8	25.2	2.46	14	— 0.65	0.66	14	126.4
Waingawa	350	44.2	+ 0.1	61.5	23.6	3.34	14	— 0.78	0.69	24	120.0
Wellington	415	46.6	+ 0.3	57.8	32.6	6.26	14	+ 1.17	3.25	14	92.1
Nelson	24	45.4	+ 0.1	59.2	28.8	1.70	7	— 1.73	0.80	8	178.1
Blenheim	12	45.2	+ 0.7	62.7	24.9	1.70	5	— 1.03	1.12	14	187.0
Hokitika	12	44.2	+ 0.5	60.8	26.0	10.99	13	+ 2.28	4.02	23	112.4
Hanmer Springs ..	1225	39.1	+ 1.0	61.6	15.0	4.99	12	+ 0.73	0.95	14	120.9
Christchurch ..	22	43.2	+ 1.0	64.0	25.4	2.64	12	— 0.02	0.82	14	116.6
Ashburton	323	40.8	+ 0.7	63.0	21.4	1.86	12	— 0.79	0.80	14	115.0
Timaru	56	41.6	+ 0.3	56.2	22.2	1.82	4	+ 0.09	0.67	23	118.0
Alexandra	520	38.1	+ 2.2	59.0	22.0	0.40	9	— 0.25	0.11	16	115.1
Taieri	80	42.0	+ 1.0	64.4	20.4	1.38	15	— 0.75	0.28	16	86.3
Invercargill ..	32	42.6	+ 1.9	56.0	22.0	2.40	21	— 0.60	0.23	12	78.3

Bursaries for Agricultural and Scientific Study

THE Public Service Commission offers annually on behalf of a number of Government Departments a limited number of bursaries for competition among boys and girls leaving post-primary schools. The bursaries provide for full-time university study as a preliminary to professional careers in science or agricultural science with the Departments of Agriculture and Scientific and Industrial Research and the Air Department (meteorological office).

Under this scheme the Department of Agriculture selects bursars for careers in two main fields, extension work and research. For extension work (B.Ag.Sc. degree) ultimate appointment will be as Instructor in Agriculture with the Department's Extension Division.

The main job of the Instructor in Agriculture is to keep in close touch with the farmers in his district and pass on to them the latest advice and information, more generally in relation to pastures, crops, and general farm management.

Research Work

In research work graduates with B.Sc. degree (and some with B.Ag.Sc.) are employed with either the Animal Research Division or the Extension Division. In the first division work is mainly on the investigation of animal disease at the Wallaceville Animal Research Station and on breeding, nutrition, and general management at the Ruakura Animal Research Station. In the Extension Division employment is mainly with the Rukuhia Soil Research Station, which works on problems of soil fertility and the maintenance and improvement of pastures and crops.

While at university bursars have their tuition fees and text books paid for and receive a cash allowance of £70 for the university year. This is increased by £40 if a bursar has to board away from home.

The entrance standard is high. Applications will be considered only from boys or girls who have passed the Special Bursary Examination or the University Entrance Scholarship examination.

Additional bursaries are offered under a separate scheme for cadets wishing to become Horticultural or Apiary Instructors.

Full details may be obtained from the Personnel Officer, Department of Agriculture, P.O. Box 3004, Wellington.

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RENEWALS OF SUBSCRIPTIONS TO "JOURNAL"

Renewals of subscriptions to "The New Zealand Journal of Agriculture" should be paid to the nearest office of the Department of Agriculture. Subscribers can ensure continuity of delivery by paying their subscriptions as soon as possible after receiving their renewal notices and at least 1 month before the old subscription expires. When payment is made the renewal notice should accompany the subscription to ensure that the correct details are recorded.

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FARMING IN NEW ZEALAND

Gisborne - East Cape District

WITH its relatively low rainfall, sunny climate, and large proportion of fertile hill country the Gisborne-East Cape district is particularly suited to sheep farming; in fact it is dominantly sheep-farming country and overseas visitors describe the area as some of the finest sheep country in the world. The Gisborne Land District includes the counties of Opotiki, Matakaoa, Waiapu, Uawa, Cook, and Waikohu, but as Opotiki County geographically comes within the Bay of Plenty district, the following article by A. A. Duncan, Instructor in Agriculture, Department of Agriculture, Wanganui, and formerly Instructor in Agriculture, Gisborne, excludes Opotiki County and therefore does not embrace the whole of the Gisborne Land District.

THE Gisborne-East Cape district is an extensive pastoral farming area on surface-sown hill country. It supports 5 to 6 per cent. of the Dominion's breeding ewes and has an average carrying capacity of 4/5 breeding ewe and 1/5 cattle beast per acre of sown grass. Large consignments of sheep leave the district annually for all parts of the North Island, particularly the Waikato and Bay of Plenty, where they are in keen demand.

Large holdings were originally taken up by a few early settlers, and the land when cleared of bush proved fertile, healthy, and productive and gave the owners a good standard of living. The wealth and large tracts of the Gisborne sheep stations became well known all over the Dominion and some glamour became associated with east coast run holding; life on east coast sheep stations was regarded as the most desirable farming existence.

The district has one of the highest proportions of Maoris to Europeans in New Zealand, approximately 47 per cent. of the rural population being Maoris, many of whom are engaged in farming. They are playing an increasingly important part in agriculture in that where it is financially possible they are taking over the farming of Maori land previously leased to Europeans.

The district lends itself to all phases of primary production and it is expected that there will be a greater diversification of farming in the future.

History of the District

On October 7, 1769, Captain Cook sailed the Endeavour into the deep waters of a bay (which he later named Poverty Bay) and 2 days later sent a party ashore for food and water, but they met with a hostile reception and withdrew without the much-needed supplies. Cook then sailed for Tolaga Bay, where supplies were obtained and some trading was begun. In his journal Cook wrote:—

> The land on the sea coast is high with steep cliffs and back inland are very high mountains. The valleys and sides of the hills are luxuriously clothed with woods and verdure and little plantations of the natives dispersed up and down the country. The soil of both the hills and valleys is light and sandy and very proper for the producing of all roots.

The district's trade began in the 1830's when Australian ships loaded *Phormium* (flax), pork, potatoes, and whale oil. At this time flax was grown fairly extensively in the Tolaga Bay district. In the 1850's shipments of wheat were made to Auckland and Australia.

Pioneer Settlers

Captain J. W. Harris, who arrived in May, 1831, was the first permanent resident. He established trading posts and grazed cattle and horses and later sheep. Captain G. S. Read, who settled at Tauranganui in 1852, became a leading merchant, ship owner, and financier, even to the extent of issuing his own bank notes, and was known as the "King of Poverty Bay."

In the 1860's progress was halted because of strife with the Maoris; the Hauhaus were defeated at Waerenga-a-hika in 1865 and in 1869 the Te Kooti massacre at Matawhero occurred. The Gisborne military post and trading station was established in 1870, the population of the township then being 400 to 500. In the same year the town was surveyed, farm areas began to open up, and settlement began in earnest. In 1875 Gisborne was brought into contact with outside districts by the completion of the telegraph line to Napier, and by 1886 its population had grown to 2300. Refrigeration was the spur to progress; in 1889 the first freezing works was erected by Nelson Brothers on the Taruheru River, 3 miles north-west of Gisborne. (The works was later closed down and Nelson Brothers renewed operations at Waipaoa on the Waipaoa River in 1916.) The Kaiti works, promoted by Gisborne sheep farmers, was opened in 1897, confidence in the frozen-meat industry was established, and store-sheep values doubled. Wethers which before 1897 sold at 6s. 6d. now realised

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Heading photograph by "The Weekly News".

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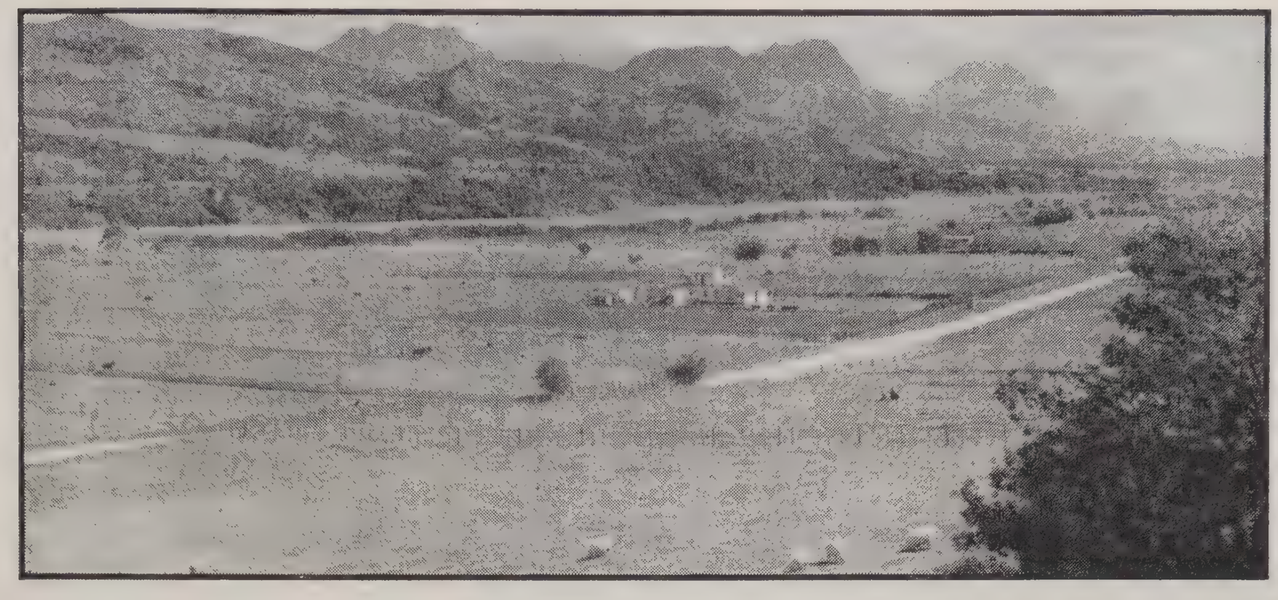


[*National Publicity Studios photo.*

Maori farms in the Waiapu Valley. Of the rural population of the Gisborne-East Cape district about 47 per cent. are Maoris. They are playing an increasingly important part in the agriculture of the district.

13s. 6d. The Tokomaru Bay works was opened in 1910 and in 1920 a freezing works at Hicks Bay began operations, but the latter works and that at Waipaoa subsequently ceased operating. In 1901 the Kia Ora dairy factory was established at Makaraka. The production of frozen meat and wool increased year by year as can be gauged from the following production figures.

TABLE 1—SHEEP NUMBERS AND PRODUCTION FROM SHEEP INDUSTRY

	Number of sheep	Frozen mutton cwt.	Wool lb.
1895 ..	877,237	26,166	2,733,190
1911 ..	2,019,878	259,027	15,489,102

Timber Production

Extensive bush felling was done between 1886 and 1925, thousands of acres of heavy bush being cleared and burnt and the land sown down to pasture and stocked with sheep. Timber milling was a major activity from 1870 to 1930. Milling was started first in the Makauri-Ormond district in 1870 and 50,000 superficial feet a month of white pine was cut and sent to Auckland and Australia. In 1902 the first railway, between Gisborne and Ormond, was opened to cope with the transport of timber to Gisborne harbour. The centre of timber production, mainly of rimu and matai, gradually moved inland through Waipaoa, Puha, Rakauroa, and Matawai to Motu, and the railway trailed behind it. In the early 1930's timber milling was at a peak in the Matawai-Motu districts, with an annual production of 6,000,000 superficial feet.

Maori Land

The East Coast Native Trust Land Board was formed in 1902 to administer approximately 390,000 acres of native land which at that time was heavily encumbered. After selling some land and liquidating the debt to the bank the board was abolished in 1906 and the remaining land vested in a single trustee, known as the East Coast Commissioner, who was given power to farm the land. Until recently he controlled approximately 230,000 acres, but 110,000 acres comprising the Mangatu block has now passed to the control of the Maori owners.

Search for Oil

The formation of the hill country suggests the presence of oil, and many unsuccessful attempts were made to locate it from 1875 to 1939. Perhaps the most spectacular incident was in 1887 when at a depth of 1850ft. in the Ngatapa district there was a blow-out of oil and gas, which became ignited and burnt down the plant.

Transport and Power Difficulties

The railway to Napier, which was completed in 1942, has been valuable to the district, especially to the southern portion. Until 1943 there was very little cash cropping, except of maize and ryegrass seed; almost all farm revenue came from grazing animals. Since 1943 there has been a marked increase in the area of cash crops grown and at present the plough is claiming more and more ground.

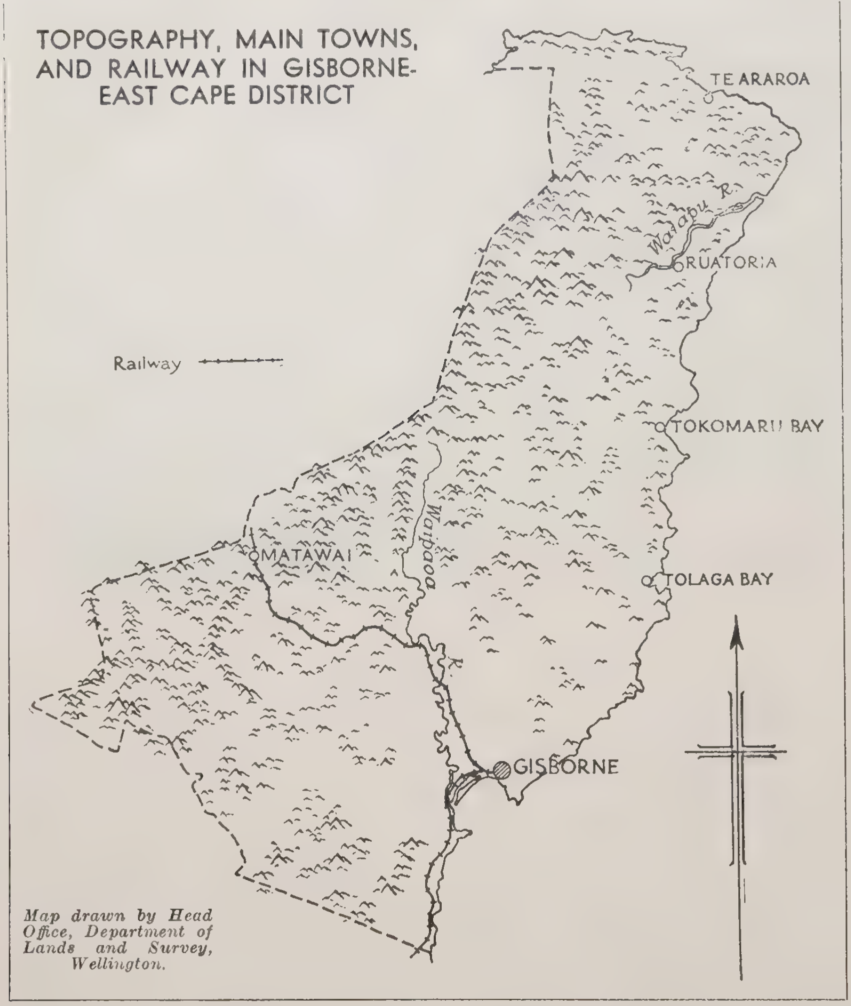
Of the many problems faced in the development of the Gisborne-East Cape district the chief have been difficulty of access and lack of electrical power. The encircling hills were expensive and difficult to road because supplies of good metal were very scattered and large slips were frequent. Sea communication was handicapped by absence of good natural harbours. As the flow of rivers in the district falls to a trickle in summer, they are not suitable for the generation of electrical power. Gisborne is supplied from Lake Waikaremoana, but areas further than 25 miles north of Gisborne have not been reticulated. These factors account also for the lack of industrial activity in the area.

Topography and Climate

The district stretches from the Wharerata hills in the south to Cape Runaway in the north, an area of 2,000,000 acres, of which approximately 1¾ million are occupied. The Raukumara Ranges form a distinct western boundary, the highest peak in the range being Mt. Hikurangi (5606ft.). The sea forms the eastern boundary and numerous small bays dot the coastline. The expanding and prosperous town of Gisborne, which has a population of 17,000, is the only sizable town in the area. The most important townships are Matawai, Te Karaka, Tolaga Bay, Tokomaru Bay, Ruatoria, and Te Araroa. Gisborne is almost the sole distributing centre and its harbour and railway terminal take most of the produce from the district, the only exceptions being wool from a proportion of Uawa County shipped from Tolaga Bay and frozen mutton and wool from Matakaoa and Waiapu Counties shipped from Tokomaru Bay.

The area includes a large tract of fairly steep hill country and there is comparatively little flat land. The Waipaoa, the main river of the district, has overflowed its banks three times in the last 15 years and caused much damage to crops, pasture land, and houses on the Gisborne flats. In the 1948 flood 20,000 head of stock were lost.

The annual rainfall varies from approximately 45in. on the coastal areas to over 60in. on the higher inland country. It is not well distributed over the year and usually there is excess rainfall in winter and spring and often drought conditions in summer. The low rainfall in summer and consequent dry conditions are accentuated by the dry westerly, the prevailing wind. Most of the heavy rain associated with flooding comes from cyclonic disturbances, and falls of up to 4½in. in 24 hours in such



TOPOGRAPHY, MAIN TOWNS, AND RAILWAY IN GISBORNE-EAST CAPE DISTRICT

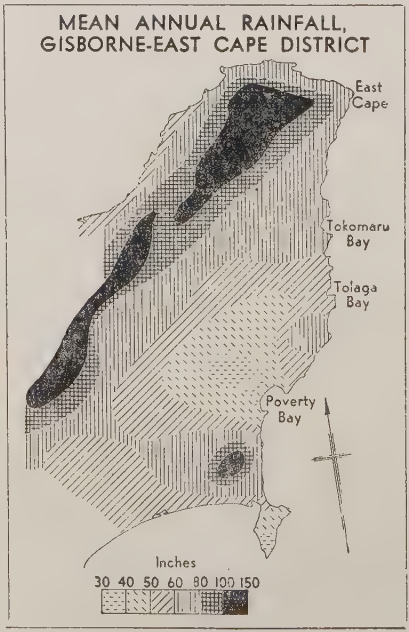
Map drawn by Head Office, Department of Lands and Survey, Wellington.

periods are not uncommon. With such distribution and intensity of rainfall it is understandable why erosion is so widespread in the district. The rain-bearing southerly is usually cold in winter and spring and is often the cause of mortality in newly born lambs. Although frosts are experienced, on the coastal areas they are relatively light compared with those in most other parts of New Zealand. Occasional late frosts in October damage tomato, maize, and potato crops. Infrequent falls of snow occur on the high country, but lie only for a few days. In some years quite heavy summer hail storms occur and do considerable damage to stone-fruit crops.

Soils

The soils of the Gisborne-East Cape district are classified into four groups.

1. **Skeletal yellow-brown earths:** These soils, which are derived from mudstone and papa, occur on the steep country. There are patches of greywacke and sandstone throughout the papa-country belt, the greatest single area being in Matakaoa County. The soils derived from greywacke and sandstone formations have not the fertility of the papa country, and under the high rainfall of Matakaoa County pastures quickly revert to secondary growth.



MEAN ANNUAL RAINFALL, GISBORNE-EAST CAPE DISTRICT

Papa and mudstone, being sedimentary rocks with a high lime content, crumble down to a fine, "sweet" soil which maintains a productive sward of grass. Because of the steepness of the country there is in effect a thin layer of weathered papa (the topsoil) overlying papa rock (the subsoil). There is a continual movement of weathered papa from the top to the bottom of slopes and this acts as a fertiliser of new soils and helps to maintain pasture in first-class condition. Thus papa country usually makes good grazing land, but unfortunately this is not always so, as at high elevations and under high rainfall, secondary growth comes in very strongly.

Papa rock is very subject to erosion, and much serious slipping and gullying takes place. To farm successfully country on which erosion is fairly severe an increasing amount of attention must be given to preventive methods such as space planting of trees, erection of debris dams, and the maintenance of a good grass cover. Minor surface slips are of no moment, because they regrass and heal over quickly.

The water supply of the country runs out fairly quickly in dry summers and measures have to be taken to ensure its preservation; such measures include the construction of concrete dams across creek beds and the excavation of natural hollows with bulldozers to form large pondage areas.

At present only a very small part of the papa country is topdressed with superphosphate. Lime and potash are not required, but good responses are obtained with superphosphate applied at the rate of 2cwt. per acre.

2. **Yellow-brown earths:** The yellow-brown earths occur as a block of rolling to moderately steep hill country occupying approximately 60,000 acres in Waiapu County. The soil is friable, crumbly, and free draining and is yellowish brown, due to a high iron content. The soils have been formed through the weathering of the mudstone and argillite and originally were in heavy bush. Since being cleared much of the easier country has gone back into manuka. The rainfall is high over the area, about 80in., and this coupled with the free-draining nature of the soil results in fairly high loss of plant nutrients to the drainage water. Responses are obtained from the use of lime, potash, and phosphate, though the response to the last is much more marked than that to lime and potash, and it is the only fertiliser considered economic in the area. The easy manuka country can be brought into useful production by clearing it and sowing down with an initial dressing of 3cwt. per acre of superphosphate followed by dressings of 2cwt. per annum.

3. **Yellow-brown pumice soils and yellow-brown loams:** These soils have been formed from the Gisborne and Taupo ash showers, the pumice from the Gisborne shower being generally much coarser than that of the Taupo shower. In the main they cover rolling hill country with an easy gradient and occur in the Motu, Matawai, Waerenga-a-hika, Rere, Tiniroto, and Wharerata districts. In the natural state the land was of very low fertility with manuka occupying the hill slopes

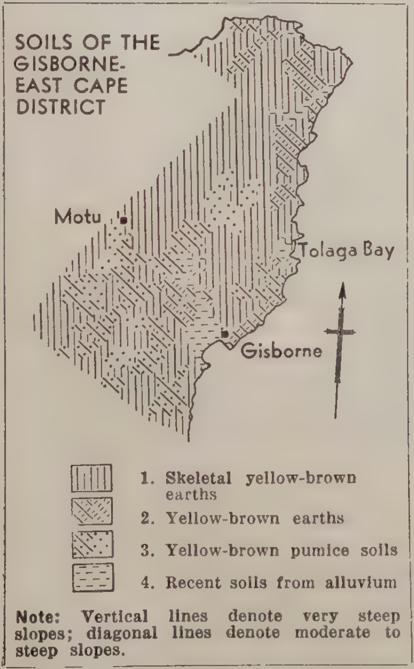
and rushes and fern the flatter portions. The pumice is for the most part very free draining. Where waterlogging occurs areas can be drained successfully with open drains or manuka fascines. Mole drainage is not satisfactory as nowhere in the profile is there a band of clay to hold moles successfully.

The low natural fertility is accounted for by the extreme lack of phosphate, but when the country is cleared and sown down with Certified seed and an initial dressing of 4cwt. per acre of superphosphate followed by annual dressings of 2cwt. an excellent transformation takes place. It then becomes good fat-lamb country. The trace element cobalt is lacking and to prevent bush sickness cobalt is applied in the form of cobaltised superphosphate. Dressings of ½ ton and 1 ton of lime per acre give a moderate response, but in most cases the cost is too high.

4. **Recent soils from alluvium:** These are the soils of the river flats and aggregate 110,000 acres. The biggest single area is the Gisborne flats, built up by the Waipaoa River and covering 52,000 acres. Other important areas are the Tolaga Bay and Ruatoria flats, built up by the Uawa and Waiapu Rivers respectively.

The soils of the Gisborne flats are of high fertility and free draining and in places the alluvial soil is 25ft. deep. The flats have almost unlimited cropping power and crops of maize have been grown for 20 years on the same ground without fertiliser of any kind and in the final year have given yields above the Dominion average for the crop. The ground, except the heavily silted land, which pugs if attempts are made to work it while wet, is easy to cultivate.

The portion of the flats liable to flooding (in 1948 most of them were flooded) does not require lime, as the silt from the Waipaoa River is rich in lime and is in fact equivalent to a dressing of a poor-grade limestone. The potash content of the soil is particularly high and the phosphate content high; thus for grassland farming there is no need to topdress.


SOILS OF THE GISBORNE-EAST CAPE DISTRICT
Motu
Tolaga Bay
Gisborne
▥ 1. Skeletal yellow-brown earths
▨ 2. Yellow-brown earths
▨ 3. Yellow-brown pumice soils
▤ 4. Recent soils from alluvium
Note: Vertical lines denote very steep slopes; diagonal lines denote moderate to steep slopes.

Erosion on the Whatatutu hills with silt-covered land in the foreground. Over a considerable area of the Gisborne-East Cape district erosion is a serious problem.

The area stretching from Makaraka through Gisborne to Wainui has been formed through the interaction of river silt and raised beaches and pumice from the Gisborne ash shower. The soil is of a very free-draining structure and ideal for winter gardening provided green manuring is practised.

The terrace soils at Puha and Whatatutu are much lighter than the river flats and have only limited cropping power. They dry out quickly in summer, but remain in a good friable condition throughout winter. Responses are obtained by the use of superphosphate or lime.

The Tolaga Bay flats have a black loam over a clay subsoil; generally, deep ploughing reveals the clay subsoil. Much of the land is low lying and not free draining and is waterlogged or partially so during winter and spring. Lime used in conjunction with drainage brings about a marked improvement.

The Ruatoria flats and the flats around Te Araroa are built up of shale and greywacke from the surrounding and inland hills. Gravel and larger stones are apparent and the soil has little organic matter and little depth of fine material. It is not of high fertility, dries out rapidly, and can be used only for very intermittent cropping. The soil is deficient in both lime and phosphate and when both are used in conjunction reasonably good responses are obtained.

Land Utilisation

Of the occupied area of 1,760,000 acres 83 per cent. or 1,470,000 acres are in grass. This area and some in scrub and second growth are utilised mainly as grazing for the district's 2,000,000 sheep and 319,000 cattle. Supplementary fodder crops are not grown extensively, but on the flat areas, particularly around Gisborne, maize is an important crop and 50 per cent. of the Dominion's acreage in maize for threshing is grown in this area. Around Gisborne increasingly large areas are being devoted to market garden crops and in 1948 the area had reached 439 acres compared with 60 acres in 1920.

Trends in Production

Though sheep numbers for the whole district decreased from 2,118,000 in 1920 to 2,069,000 in 1948, the position is masked by the improvement which has taken place on the flats and by the increase in the number of cattle carried. In Cook County, for instance, total sheep increased from 636,000 to 696,000 in the period, this being due largely to the expansion of fat-lamb production on the Poverty Bay flats.

The position generally is one of declining sheep numbers on the hill country and increasing numbers on the flat areas.

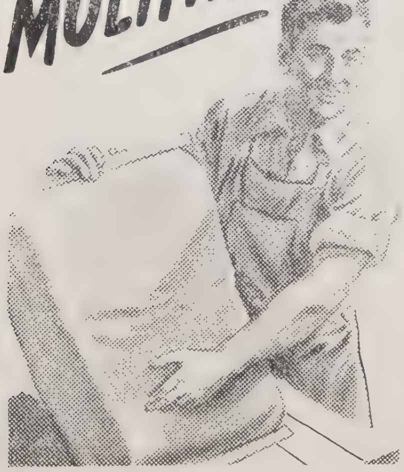
Cattle numbers, excluding dairy cows in milk, have shown a considerable increase—from 175,900 to 299,200 in the 1920-48 period. In 1925 in the northern part of the district the number of beef cattle per 100 sheep shorn was between 8 and 9 and in the southern part between 10 and 11; in 1948 the ratio for the whole district was between 14 and 17.5 head of cattle to 100 sheep.

The total of dairy cows in milk rose from 10,000 in 1920 to 30,200 in 1935, but has since fallen, the most rapid decline occurring since 1940, when there were 26,300 cows in milk against 19,900 in 1948.

Some idea of the importance of the livestock industry in the district can be obtained from the killings at the freezing works. (See Table 3.)

"When it's
a question of
fertilizer bags. . .

I'm all for
MULTIWALLS"



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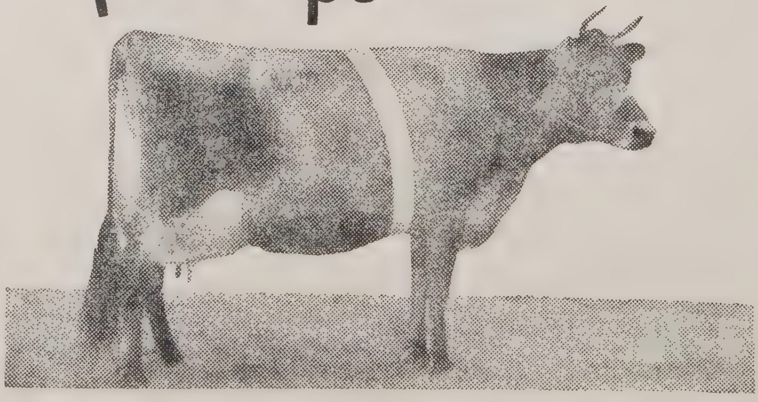

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Livestock and Farm Management

The Romney is by far the dominant sheep breed; 89 per cent. of all rams used are Romneys and this illustrates that the Gisborne-East Cape area is a Romney breeding district rather than a district for the production of fat lambs. Ewes surplus to requirements, amounting to 250,000 to 300,000, find a ready market in the Waikato and Bay of Plenty and are disposed of in January or February. Most of the male progeny are fattened within the district as lambs or 2-tooth or 4-tooth wethers.

The Southdown is used to a varying extent for the fat-lamb trade. Fat-lamb raising is most widely practised in Cook County, where 18 per cent. of the rams are Southdowns. The bulk of the Southdown-cross lambs are fattened on the hill country where they are bred, the tail-end lambs being fattened on dairy farms or mixed-cropping farms on the Gisborne flats. Uawa County has the lowest percentage of Southdown rams (2 per cent.), while Matakaoa, Waiapu, and Waikohu Counties have 5 per cent., 6½ per cent., and 10½ per cent. respectively. In these counties the lambs are fattened by being carried lightly on the better paddocks of the holdings.

Lincoln, Border Leicester, and Ryeland breeds account for less than 1 per cent. of the total sheep and are of no economic significance. With the present outlook of quantity rather than quality of export lamb, the Border Leicester is coming into favour to a limited extent as a fat-lamb sire.

Although the area can be described broadly as breeding country, dry-ewe and wether numbers are 20 per cent. and 24 per cent. respectively of the breeding-ewe totals in Waipu and Uawa Counties. A proportion of the inland country in these two counties is steep and of low fertility and wethers are used to help crush fern and secondary growth.

Beef Cattle

Beef cattle are playing an increasingly important part in the farming of the hill country of the district. With fertility declining pastures are becoming more difficult to control for sheep, and because of this, run cattle numbers are being increased.

Cattle numbers have increased considerably in the Gisborne-East Cape district in the past 25 years and the ratio of beef cattle to sheep now ranges between 14 and 17.5:100.

Farming on the hill country is, for practical purposes, grassland farming, as supplementary fodder crops do not aggregate .01 per cent. of the area. As a rule there is plenty of feed in spring and autumn. Growth comes almost to a standstill during winter and the aim in management is to dispose of all surplus stock in early autumn and to enter the winter with a carryover of autumn growth. In drought summers there is a general shortage of feed and cattle numbers have to be reduced.

Pasture management on most holdings consists of putting in a particular paddock in autumn the estimated number of sheep it will carry and leaving them there until weaning time (December to January). Any surplus growth is utilised by rotational shifting of cattle.

TABLE 2—UTILISATION OF LAND, AND STOCK CARRIED IN GISBORNE-EAST CAPE DISTRICT, 1947-48*

	Counties					
	Matakaoa	Waiapu	Uawa	Waikohu	Cook	Total
Total acreage	188,800	507,520	167,040	678,400	506,240	2,048,000
Acreage occupied ..	145,628	427,167	151,304	545,989	489,028	1,729,116
Number of holdings ..	199	525	127	416	1,064	2,331
Acreage sown in grass ..	103,695	356,190	131,916	452,101	423,240	1,467,142
Acreage in green-fodder and root crops ..	35	353	60	1,235	1,401	3,084
Acreage cut for hay and silage	93	301	126	1,060	2,032	3,612
Acreage in maize for threshing	35	345	127	505	2,638	3,650
Acreage in cash crops, excluding maize for threshing	—	187	452	421	1,878	2,938
Acreage in market garden	—	9	—	5	425	439
Total sheep	110,094	436,909	217,797	608,202	695,902	2,068,904
Breeding ewes	60,889	240,671	119,436	347,509	420,978	1,189,483
Total cattle	21,351	67,056	28,626	100,952	101,146	319,131
Dairy cows in milk ..	1,825	4,355	1,556	3,677	8,509	19,922

* Figures from "Statistical Report on Agricultural and Pastoral Production, 1947-48".

TABLE 3—KILLINGS AT FREEZING WORKS

Year	Beef	Bobby calves	Pigs	Sheep	Lambs
1945 ..	15,643	9,208	10,653	196,172	285,193
1946 ..	18,350	9,045	8,291	255,172	351,569
1947 ..	19,320	9,618	6,787	176,782	335,692

The farming land may be divided into 3 main sections: High hill country, medium hill country, and flat land.

High Hill Country

The high hill country occupies 600,000 acres and consists of the foothills of the ranges. On the upper fringe is the main-range forest, consisting of tawa, beech, rimu, totara, rewarewa, matai, kohekohe, wineberry, five finger, and supplejack. The contour of the cleared country is variable, there being steep and rugged faces interspersed with rolling country. Most of the area is 2500ft. high, elevation being lost toward the sea. In places where a good primary burn was not obtained stumps and tree trunks litter the ground, hinder stock management, and act as good cover for secondary growth. Fern and scrub come in fairly strongly on much of the area, particularly on the steeper faces. The instability of the country can be gauged from the fact that in places hundreds of acres are slipping.

Because of the steepness, elevation, and relatively low carrying capacity of the country, holdings necessarily are large and families on the farms are remote from shopping and entertainment centres. This isolation makes the keeping of good permanent labour a problem. Access to back stations, which are usually served by clay roads, is not good and the bulk of the farming supplies has to be brought in during summer. Transport costs are high, which makes the application of much-needed phosphate very expensive.

Climate

Because of elevation winter temperatures in the high hill country are cold, but not sufficient to produce snow conditions. Snow is consistent only on

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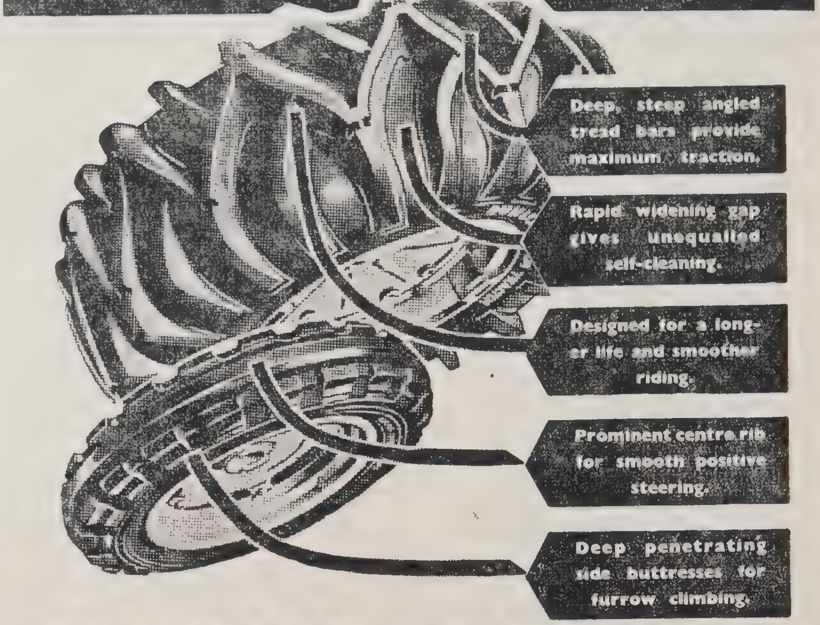
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High hill country of the Gisborne-East Cape district. The annual rainfall ranges from 60in. to about 100in. Farm revenue comes from the sale of wool, store sheep, and cattle.

isolated peaks of the main range, Mt. Hikurangi in particular. The annual rainfall is high, varying from approximately 60 to 100in. over the greater part of the area, but with falls up to 150in. on the highest country. At times rainfall can be very intense; a case is the recording of 5.4in. in 24 hours on an inland station in the Waiapu Valley. The wet period extends from late autumn through winter to early spring. There is usually, however, sufficient summer rainfall to maintain adequate moisture for plant growth. The area is essentially summer country, as growth almost comes to a standstill during the cold winters. August and September with their cold biting winds are usually the two most unpleasant months.

Pastures

Pastures were established after the bush burns with varying mixtures at the rate of 20 to 30lb. of seed per acre. Mixed clovers (white and annuals), ryegrass, and cocksfoot were usually included and crested dogstail, danthonia, *Poa pratensis*, and browntop were used to some extent. Soft turnips grew excellently after the burns and ¼ to ½lb. of seed per acre was often included in the pasture mixture, especially in the Matawai area. Immediately after the burns pastures were good, but later there was deterioration.

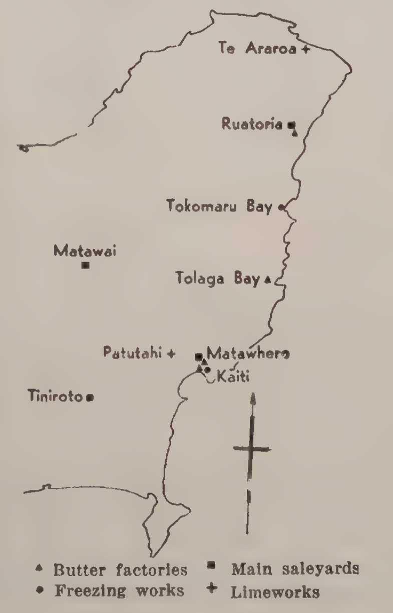
In the wettest and highest areas, where there was only a shallow depth of topsoil, secondary growth and fern strongly invaded the pasture land. Erosion helped to speed the ingress. Papa country on which the rainfall did not exceed 70in. held the sown grasses and clovers reasonably well. The pumice lands quickly went back into manuka, but with the comparatively recent use of superphosphate these lands are being raised to a standard of fertility previously undreamed of and good pastures can be maintained.

At present the dominant grasses on the higher hill country are browntop, danthonia, crested dogstail, sweet vernal, and Yorkshire fog. Cocksfoot and ryegrass are prominent in swards on isolated flats and in fertile dips and depressions. Suckling, striated, and clustered clover, with some white clover, are the only clovers over wide areas. On topdressed country white clover and oversown subterranean clover are valuable constituents of the sward. *Lotus major*, which was sown originally on a small proportion of the country and on most of the more recent burns, has proved particularly useful. When established it maintains a green, healthy appearance even in extremely dry periods. With its ability to thrive in shady places it grows up among secondary growth and tree stumps, thus enticing stock on to patches which normally they would not graze. The resultant tramping of stock helps considerably in combating secondary growth. Unfortunately *Lotus major* does not establish satisfactorily when oversown.

Farm Management

The average carrying capacity on the high hill country is ¾ sheep to the acre and 1 cattle beast to 8 acres. The Romney is used almost exclusively and much attention is focused on wool quality; of the cattle breeds Herefords and Polled Angus are equally popular. Sheep have their set paddocks for most of the year, but cattle are run in as large a mob as possible and rotated from paddock to paddock. The ruggedness of the country and its tendency to revert to secondary growth necessitate cattle being used as an implement. The type of cattle used—cows and calves and the calves kept, cows and calves with the calves sold as weaners, or dry stock—varies from farm to farm. Where the owner can afford to run dry cattle exclusively they are without doubt the best means of keeping the country clean. Cast-for-age ewes and 2-tooth ewes which are not of good type or do not measure up to the owner's standards for wool are sold in late summer or autumn. Wether sheep are sold as lambs, 2-tooths, and 4-tooths according to the season. Store cattle are sold in autumn before cold conditions set in and pasture growth stops. Winter supplementary crops are grown only to a very limited extent, but are a real asset. Stock losses are high and the lambing percentage is not good. Lamb losses due to wild pigs are heavy on back holdings.

BUTTER FACTORIES, FREEZING WORKS, MAIN SALEYARDS, AND LIMEWORKS IN GISBORNE-EAST CAPE DISTRICT



It is a young man's country and the personal factor plays a very big part in management.

Deterioration

By far the greatest problem facing the district is the deterioration of this higher hill country. The effect is becoming more pronounced every year and manifests itself in reversion to secondary growth, spread of weeds, and erosion. A combination of the three factors results in country going out of production.

Several factors have operated to promote deterioration. Thousands of acres were sown down with inferior seed masquerading under the title of "suitable for bush and manuka burns," bad strikes resulted, and the bare areas were ideal for the regrowth of scrub and the spread of weeds. The introduced weeds ragwort and variegated thistle now have a strong hold and their eradication on some holdings constitutes the greatest single farming cost. Because of financial commitments and because sheep yielded a greater immediate cash return per acre than cattle, large areas were overgrazed by sheep. This policy, though profitable for the moment, resulted in a weakening of the grasses and a gradual but certain decline in carrying capacity.

Several methods of arresting or reducing the rate of deterioration may be used. They are:—

1. Application of phosphate and introduction of clover: This is probably

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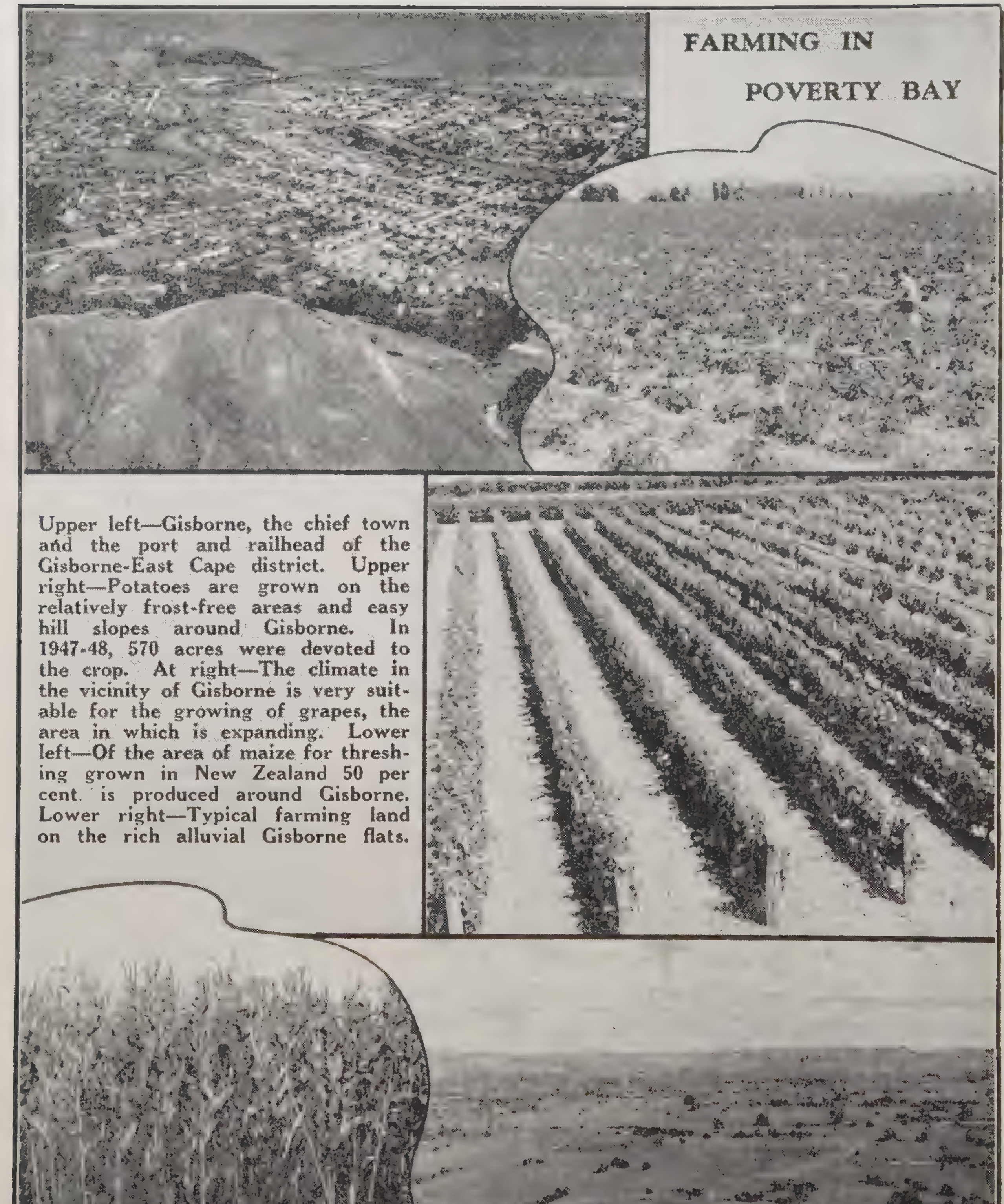

Upper left—Gisborne, the chief town and the port and railhead of the Gisborne-East Cape district. Upper right—Potatoes are grown on the relatively frost-free areas and easy hill slopes around Gisborne. In 1947-48, 570 acres were devoted to the crop. At right—The climate in the vicinity of Gisborne is very suitable for the growing of grapes, the area in which is expanding. Lower left—Of the area of maize for threshing grown in New Zealand 50 per cent. is produced around Gisborne. Lower right—Typical farming land on the rich alluvial Gisborne flats.

[Upper left photograph by V. C. Browne.

the greatest single method and where it has been used it has given good results. It is essential to sow both the phosphate and the clover; one without the other involves a big cash outlay with very little return. Subterranean clover is first choice for the drier westerly faces and white clover for the southerly faces.

2. Systematic grazing: Where practicable a system of spelling and grazing should be used to the utmost. In autumn and spring especially periodic spelling gives the stronger-growing grasses a chance to exert their superiority and they tend to crowd out the weaker-growing species.

3. Increasing cattle numbers and decreasing sheep numbers: This policy keeps the sward longer throughout the year and reduces run-off and erosion, thus increasing the effective rainfall. If sheep numbers are reduced there is a tendency toward increased lambing percentages and an increased weight of wool per sheep. The more severe the previous overgrazing, the greater the improvement in these respects. The figures in Table 4, from a holding of 8000 acres at an average altitude of 2300ft., though perhaps better than the average to be expected from this policy, serve as an illustration.

4. Widespread adoption of the principles of erosion control as advocated by the local catchment board.

5. Use of only Certified seed after scrub and fern burns.

6. Increased winter supplementary cropping: Under a system of purely grass farming cattle numbers have to be reduced before the onset of the winter-growth stoppage, and in the spring flush the cattle which have had to be sold off are needed for controlling fern, etc. On holdings that have land suitable for cropping, winter-feed crops help to overcome the difficulty.

TABLE 4—SHEEP CARRIED AND WOOL CLIP FROM 8000-ACRE PROPERTY ON HIGH COUNTRY IN GISBORNE-EAST CAPE DISTRICT

Year	Ewes	Lambs	Lambing percentage	Dry sheep wintered	Total sheep wintered	Total weight of wool lb.
1943 ..	5,882	4,032	60	3,673	9,555	75,838
1944 ..	4,916	4,260	86	3,462	8,378	77,131
1945 ..	4,588	4,313	94	3,523	8,111	77,035
1946 ..	3,802	3,758	98	4,495	8,297	79,150

Easier Hill Country

The easier hill country includes the coastal hills, which extend to a varying depth inland and occupy approximately 750,000 acres. The elevation varies from 200 to 2000ft., the greater part of the land lying at about 1000ft. It is easy to steep country and on almost every holding there is ploughable land which can be used for cropping. The appearance of the country is enhanced by the dark green patches of native bush. There are areas of manuka, but fern is absent. Scars of surface slips are evident and gullies are numerous. Access is good, but transport costs to Matakaoa and Waiapu Counties are heavy due to the distance from the main distributing centre, Gisborne.

Climate

The area has a climate somewhat similar to Gisborne and the flat country and has temperatures sufficiently warm to promote some winter growth. At Gisborne the average annual temperature is 56.8 degrees and the range between summer and winter is not great; the average annual sunshine recording is 2270.5 hours. The rainfall varies from 35in. on the Gisborne hill country to 60in. in Uawa, Waiapu, and Matakaoa Counties. The rainfall would appear adequate, but the distribution is not good and most of the rain falls in winter. The summer rainfall is low and in some seasons does not exceed 7in. for the 5 months September-January. The prevailing wind is the dry westerly, which accentuates the drying out of the country. Because of the rapid run-off during heavy winter rains the effective rainfall on the hills is much lower than that indicated. Most of the rainfall comes from the south and south-east, except in Matakaoa County and portion of Waiapu County, where the north-westerly is also a rain-bearing wind. Because the land is close to the coast, winter frosts are not severe. The maximum frosts in Gisborne in 1941 and 1947 were 11.2 and 8.2 degrees respectively.

Easier hill country. The average carrying capacity of this land is 2 sheep per acre with an average of 1 cattle beast to 10 acres.

TABLE 5—CLIMATOLOGICAL AVERAGES FOR GISBORNE

	Rainfall in.	Temperature degrees	Sunshine hours
January ..	3.35	62.8	251.0
February ..	3.07	68.2	217.5
March ..	3.68	61.6	201.6
April ..	3.43	54.8	163.6
May ..	4.49	52.8	153.0
June ..	4.01	50.6	141.2
July ..	4.33	50.9	129.6
August ..	3.71	49.0	152.1
September ..	2.58	55.0	178.2
October ..	2.64	57.5	199.7
November ..	2.39	59.8	224.1
December ..	1.93	63.0	258.9
Annual ..	39.61	56.8	2,270.5

Pastures

The pastures on the easier hill country were originally sown after bush burns with seed mixtures the bulk of which contained ryegrass, cocksfoot, and white clover. On some of the better holdings these sown species are still dominant. At present pastures in general are predominantly danthonia, rice grass, ratstail, and hair-grass, with some ryegrass, cocksfoot, paspalum, crested dogstail, and sweet vernal. The predominant clovers are the annuals burr, clustered, and striated clover and there is some suckling clover, white clover, and English trefoil. Subterranean clover is an important constituent of the sward where it has been sown in conjunction with dressings of superphosphate. In this association ryegrass and white clover are present to a greater degree. In a way the rapid ingress of ratstail into pastures during the 1930's was a good thing. Farmers found that if they set stocked the paddocks, the ratstail areas were left rank and untouched while the rest of the paddock was eaten bare. To control ratstail farmers used more cattle, subdivided paddocks, and rotated mobs of stock, particularly cattle, around the paddocks. Thus, with the spread of ratstail there was introduced a much better system of pasture management and the trend of declining carrying capacity was checked considerably.

Variegated, winged, and scotch thistle, blackberry, and bidi bidi are the most common weeds. Variegated thistle is a serious pest, but winged thistle is not regarded so seriously. It is, however, a considerable nuisance in that it grows as high as 6ft. where the pasture has been opened up by drought or the tramping of stock around gateways, and tracks often have to be mown to allow mobs of stock to pass through.

Farm Management

The average carrying capacity of the easier hill country is 2 sheep per acre and 1 cattle beast to 10 acres. The Romney is used exclusively on some holdings and in conjunction with the Southdown on others. In the former case all the ewes are put to the Rom-

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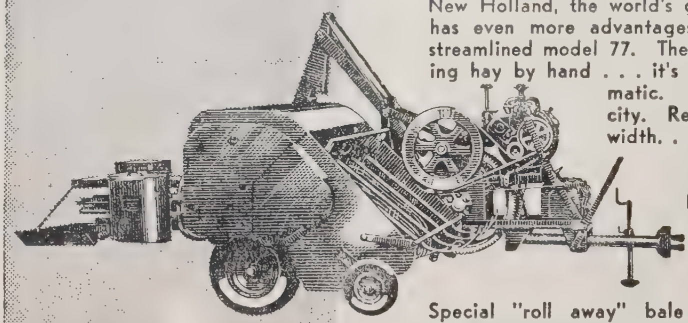

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ney ram and as many as possible of the wether progeny are fattened as lambs and 2-tooths and the remainder sold as stores; the female stock, cull 2-tooths and cast-for-age ewes, are sold at autumn fairs. In the latter case sufficient ewes are put to Romney rams to breed replacement stock and the remainder of the ewes are put to Southdowns. Under this system off-going stock consists of fat Down-cross and Romney lambs, tail-end lambs as stores, and cast-for-ages ewes. The practice of putting all ewes to the Down ram and buying in ewes each year is followed to a limited extent. The first fat lambs are killed in November and are in time to catch the English Christmas premium.

Herefords and Polled Angus are the commonest cattle breeds, but Shorthorns are still run on the better fattening holdings. Although cattle are used primarily to control pasture for sheep, a fair proportion of them on this country eventually are sent to the freezing works as fat stock. Cows and calves and young steers up to 2½ years old are used for cleaning up the country. After they are 2½ years old steers are given better treatment so that they will put on condition and reach a killing weight of 7 to 8cwt. as 3½ year olds.

The climate is very suitable for sheep farming and the health of stock is excellent. The dry summers reduce the incidence of foot-rot to a minimum and there is little liver fluke. In the past serious outbreaks of facial eczema have occurred.

All lambs are fattened on grass, and to increase the number of lambs sold fat the tendency is to improve pastures rather than to grow fattening crops. Areas of turnips and rape are grown to some extent, but are primarily used as a cover crop when breaking in country. Mechanisation is beginning to play its part on this country and internal access roads constructed by bulldozers have effected considerable reduction in the time and labour required to apply manure.

Flat Land

There is a wide variety of farming on the flat land: Cash cropping, dairy farming, sheep farming for fat-lamb production, orchards, and vineyards.

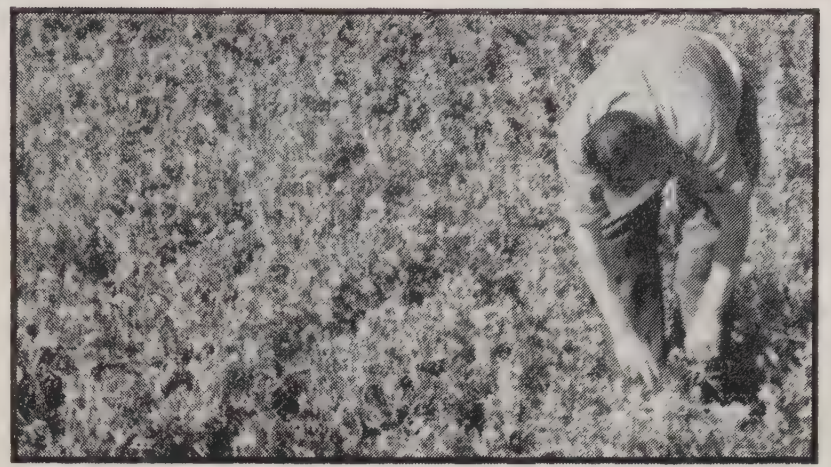
Cash Cropping

At present there is a definite trend toward an increase in the area devoted to cropping and the growing of a greater variety of crops as shown in Table 6.

TABLE 6—AREA IN CASH CROPS

	1935 acres	1940 acres	1948 acres
Maize for threshing ..	2,208	3,173	3,650
Ryegrass for seed ..	1,849	2,497	1,615
Peas for threshing ..	14	—	2,166
Barley for threshing .	147	90	537
Potatoes	225	293	566
Red and white clover	209	202	521
Beans	—	—	90
Wheat and oats for threshing ..	66	68	141
Totals	4,718	6,323	9,286

Maize has been grown for the longest period and the acreage has been steady throughout the years. It owes its popularity to the fact that it is a very sure crop. The concept of the sureness of the crop has been a little dimmed over the past 2 years by cutworm attacks when the maize was 2in. to 1ft. high. The Gisborne flats grow approximately 2500 acres with an average of 65 to 70 bushels; Matakaoa and Waiapu Counties grow 400 to 500 acres with an average of 45 to 50 bushels. In the past Marigold, Horsetooth, and Silver Queen have been the most popular varieties. The recently introduced Pfister hybrid maize from America has proved very popular and over the past 3 years has been grown on two-thirds of the total area.



In recent years peas for seed have been grown on the Gisborne flats.

Perennial ryegrass: Gisborne perennial ryegrass is well known for its permanency and high germination; 50,000 bushels were grown in the 1947 season. The best crops thresh out at 50 bushels of machine-dressed seed per acre and the over-all average is 16 bushels. The crop is autumn sown and generally the yield of maiden areas is double that of pastures that have been down for 2 years or more. Goosegrass (*Bromus mollis*) is the most common impurity. In most years the climate is ideal for the production of other small seeds.

Clovers: White clover is grown in association with ryegrass and 20,000lb. were certified in the 1946-47 season. The crop is threshed in the swath in late January or early February with a pick-up mill. Suckling clover is the most common impurity. Cowgrass (broad red clover) and Montgomery red clover grow well in the district and yields of up to 400lb. per acre are obtained. Cowgrass is the safer crop, as often autumn rains set in before Montgomery can be harvested.

Peas are a comparatively recent crop in the district, but are rapidly becoming more important. The acreage jumped from 7 in 1941 to 2166 in 1948. The popularity of the crop is due to its soil-improving qualities, short duration, and good cash return. Peas are used as a first crop when breaking in rush country. The varieties most favoured are Onward, Stratagem, William Massey, and Greenfeast. Yields of up to 60 bushels are obtained, the average being 28.

Potatoes are grown on relatively frost-free areas and easy hill slopes. Some planting takes place in March-April, but the main planting is from mid-June onward. Arran Banner is the most popular variety, followed by Epicure, Up-to-date, Sebago, and Katahdin. If crops can be dug before the end of November potato growing is very remunerative. With the increase in the area of potatoes early and late blights are becoming widespread and spraying must become an established practice. Yields average 4 tons. The district is not suited to the growing of late potatoes because from January onward the potato tuber moth is very active.

Barley is finding popularity as a spring-sown crop after maize and before sowing down to pasture in autumn. Cape and Chevalier are the most popular varieties and yields average 50 bushels per acre, which is the highest provincial average in the Dominion.

Beans: Although the acreage of beans is not large (90 acres), Gisborne was the largest grower of seed beans in the Dominion in 1946. Because of difficulty with weed growth, the crop is usually taken after grass. Canadian Wonder is the most popular variety, but some Black Wax are grown. Yields of up to 60 bushels per acre are obtained, the average being 20.

Dairy Farming

Dairy farming, though not intensive, is practised throughout the area, usually in conjunction with some cash cropping. There are 4 butter factories, 2 at Gisborne, 1 at Tolaga Bay, and 1 at Ruatoria. The Jersey is the predominant breed. In 1948 there were 547 herds of more than 10 cows, but there are few large herds and only 7 contain more than 100 cows. Herd testing is becoming more widespread and is an important factor in improving herd management.

Because of the low rainfall in summer the district is not as suitable for dairy farming as such areas as Taranaki and Manawatu. The dry summers are a real problem to the dairy farmer and the variation of butterfat production between years is closely linked to the variation in summer rainfall. The 1945 season was particularly dry and the average production per cow fell by 30lb. To keep up production over the critical period it is essential to grow greenfeed crops —lucerne and cowgrass, which do excellently throughout the area—the need for such crops being greater on the lighter soils of the Ruatoria area. The dry summers are to some extent offset by the mild winters, and ½ ton of hay per cow is regarded as sufficient winter supplement.

More land is being devoted to cash cropping and fat-lamb raising, and dairy farming is declining steadily. The combined tonnage of the 4 dairy factories fell from 2206 tons in 1942 to 1645 in 1948-49. Although dairy farming is not likely to regain its former position on the Gisborne flats, there is considerable room for expansion in the valleys of the higher inland country, where summer rainfall is greater, especially in the Motu and Matawai districts. The industry is also likely to play an increasing part in Matakaoa and Waiapu Counties.

Sheep Farming

Sheep still occupy a large area of flat land. On some of the bigger holdings they are the sole source of income and here the hill-country cast-for-age ewes are bought in autumn and put to the Down ram, and the lambs are sold fat in spring. After shearing, the ewes are fattened. Store stock then utilise any surplus feed until a fresh mob of 5- and 6-year-old ewes is bought in.

Sheep are also used in conjunction with cash cropping. The aftermath of ryegrass, white clover, and pea crops is very suitable for fattening, and as the area in these crops is increasing, more hill-country store lambs are being fattened in this manner. Special lamb-fattening crops are grown only to a very limited extent.

Fruit Growing

There are 200 acres of commercial orchards, all of which are on the Gisborne flats. The greater part of these consist of pip and stone fruits, but at present there is a trend toward extending the area of citrus. The district is ideally suited for the production of sweet oranges, lemons, marmalade oranges, and grapefruit. The demand for these fruits far exceeds the supply, but owing to the shortage of budding stocks, it will be 2 years before extensive planting is done.

A local demand only exists for stone fruits because Hawkes Bay is in a much better position to supply the Wellington market. This does not apply to early plums, which can be marketed in Wellington before those of the southern districts. The local demand for peaches and late plums amounts to 10,000 and 6000 cases respectively.

Quinces are a very remunerative crop and are exceptionally free from pests and diseases compared with other districts.

The climate is well suited to the growing of grapes, passion fruit, and tomatoes, and although the area of these intensive and special crops is not large, it is extending each year. Albany Surprise and Black Hamburg are the favourite grape varieties and yields of 6 tons to the acre are common.

Potential Improvement

Topdressing with phosphate and oversowing with subterranean clover are likely to increase the carrying capacity of much of the easier hill country from 2 to 4 sheep per acre. Mechanisation—the use of bulldozers for forming access tracks and of tractors for haulage—will increase the area of hill country coming within the practical topdressing category. Giant discs are excellent for breaking in manuka country even when the manuka is vigorous, as large areas can be dealt with quickly and efficiently, except on the steepest country.

On parts of the Tolaga Bay flats and on many smaller areas of flat land throughout the district drainage and liming will increase production considerably. At present such areas are carrying patches of rushes interspersed with which is pasture of a very poor type.

If more lucerne and cowgrass were grown, dairy production would be affected much less by dry summers and there would be a consequent increase in production.

On the specialised and more intensive small holdings growing grapes, passion fruit, citrus, and tomatoes it is probable that irrigation will play an important part.

Better grass husbandry could result in improvement of the ploughable country; the ploughing up of run-out pastures and the sowing of Certified seeds is of first importance in this respect. With the higher hill country the problem is to maintain it at its present carrying capacity rather than to improve it considerably. In this regard mechanisation and improvement of access roads are likely to be of importance.

It is certain that the volume of agricultural produce will continue to increase; it is likely that the greatest increases will be in vegetable crops, citrus, and small fruits. The warm sunny climate of the Gisborne-East Cape district is its greatest asset, an asset that assures its remaining one of the foremost sheep districts in New Zealand and probably of becoming a source of early market-garden produce for the Wellington Province.

References

"Early History of Gisborne," by C. A. McDonald.

Department of Agriculture Bulletin No. 279, "Farming in New Zealand": "Soils of the North Island," by L. I. Grange.

"Statistical Review of the Sheep Farming Industry of New Zealand," Department of Agriculture.

"Statistical Report on Agricultural and Pastoral Production," Census and Statistics Department.

FARM SAFETY

IN these days of thermostatic control the cooling system of a farm tractor gives little trouble, but as a result of some defect in the system the water in it may boil, and if the overflow pipe is blocked, steam under pressure accumulates under the radiator cap. To prevent being sprayed with boiling water and superheated steam, it is advisable to wait until the system has cooled before removing the radiator cap or to cover the cap with a sack before unscrewing it and, before removing the cap altogether, to slacken it to the first notch so that any built-up pressure is dissipated. When the internal pressure is back to normal the cap may be removed with safety.

Treat all radiator caps with respect, and if the radiator is boiling, cover the cap with a sack before removing it.

—C. J. CROSBIE, Farm Machinery Instructor,
Department of Agriculture, Christchurch.

Device for Holding Fowls During Blood Testing

BLOOD testing of poultry for pullorum disease is now carried out in New Zealand on a considerable scale and involves a great deal of labour with large flocks. On this page A. C. Howse, Veterinarian, Department of Agriculture, Christchurch, describes an appliance for holding birds which can be constructed easily and cheaply.

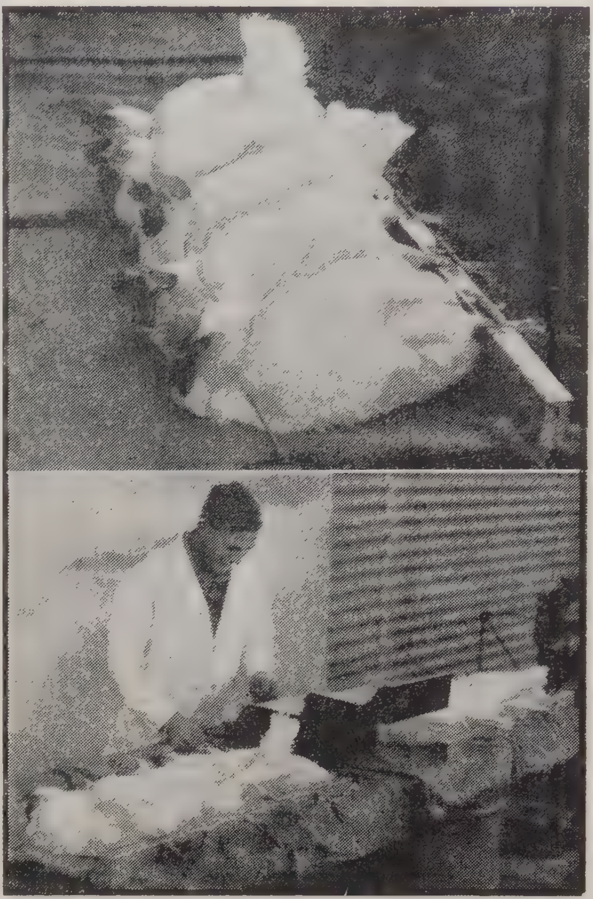
WHEN testing their stock for pullorum disease New Zealand poultry farmers to date have remained content to spend long periods holding groups of fowls on tables by hand while blood is drawn from the birds' combs, but it has been apparent that some more efficient means of holding the birds would save considerable time and labour. A device for this purpose has now been designed and constructed with the help of Mr. Arthur Button, of Lincoln, a well-known Canterbury poultry farmer. When the appliance as first designed was tried in practice many modifications and alterations from what was originally visualised were found necessary. Mr. Button carried out the work of construction and made the alterations.

Birds to be tested lie on sacking on a trestle table such as has been in general use for blood testing in New Zealand, but their legs, instead of being held by hand, are slipped into notches in a piece of suitable timber and kept in position by small door bolts, such as can be obtained from a hardware store. Beech is probably the most suitable wood. A piece 3ft. long, 1¼in. wide, and 2½in. deep will hold five birds. The notches, each of which holds both legs of one bird, should be ⅝in. wide and 1½in. deep, the centres of the notches being 6in. apart. Putting both legs into one notch has been found easier than getting each leg into a separate one. The bolt slips across the top of the notch above the legs and the bird lies slightly on its side.

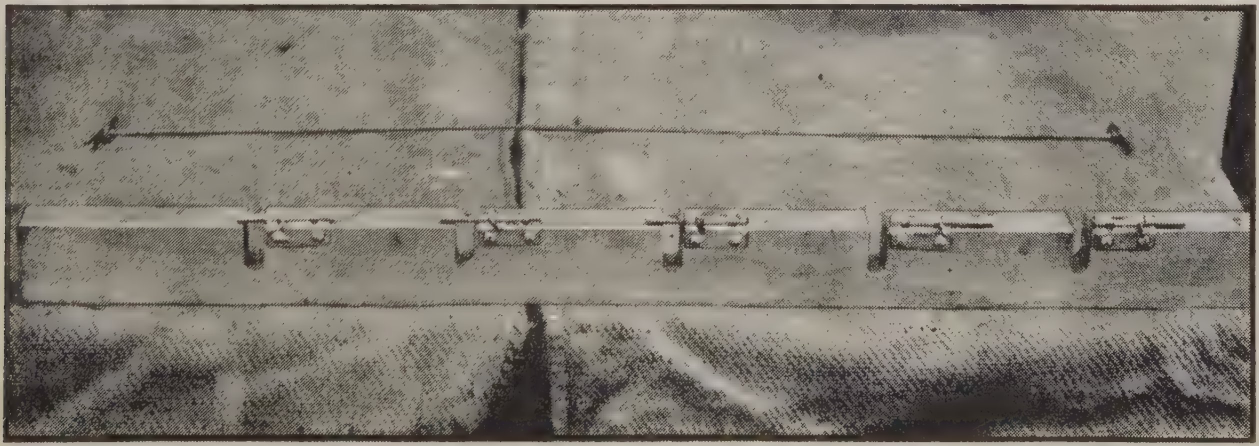
The piece of wood is bolted to the table by carriage bolts held underneath by wing nuts. If the table is 8ft. long, the testing equipment can be arranged in the middle with a group of five birds on either side. The birds' necks pass under a piece of spring curtain wire, which is fastened to the table by small staples parallel to the bar of wood which holds the legs and about 11in. away from it. The wire should be fixed so that it is under only very slight tension.

Individual farmers may devise other means of holding the legs in the notches. Probably the simplest would be a wooden turn-button, but it has been found in practice that a bird frequently opens this while struggling and escapes. Spring clips screwed directly to the table were also tried, the bar of notched wood being dispensed with, but clips of the correct size and adequate strength could not be obtained. The bolt over the notch works well and is easily obtainable.

Using this method one person catches the birds, another puts them on the table and removes them, and a third performs the test. With a table holding ten birds one group of five is dealt with while the other is removed and replaced. There is no delay while birds are taken away and others brought up, as with the older method, and birds can be tested at the rate of 120 per hour without difficulty. Fewer people are employed than when holding is by hand, an important consideration in view of the difficulty of obtaining labour.



Upper—The birds lie on the table with their legs held by bolts over slots in the wooden bar and their necks under a length of spring curtain wire. Lower—The layout for testing ten birds at a time, with the operator and testing equipment between two groups. Below—The device in which the legs of the birds are held.



PRIMARY PRODUCTION MONTHLY REVIEW

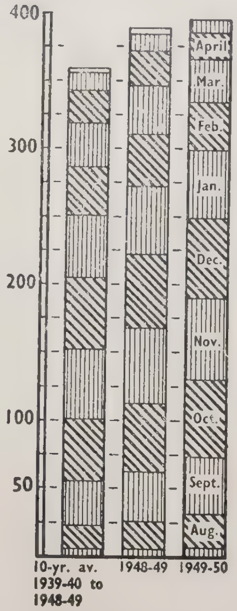
From data supplied by the Statistical Section, Extension Division, Department of Agriculture, Wellington.

DAIRY PRODUCE (FACTORY PRODUCTION ONLY)

Season July 1 to June 30: Order of months July to June reading upward in each column

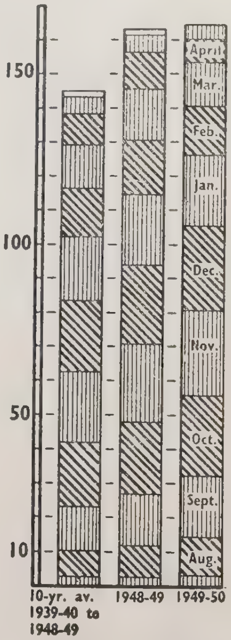
BUTTERFAT USED FOR BUTTER AND CHEESE

Millions of pounds



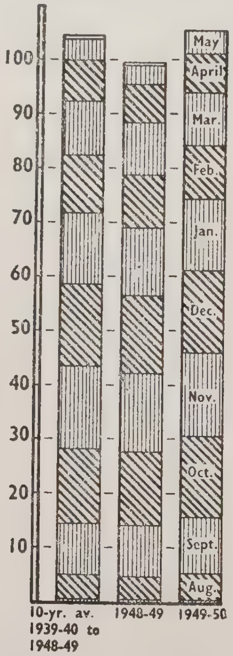
CREAMERY BUTTER

Thousands of tons



CHEESE

Thousands of tons

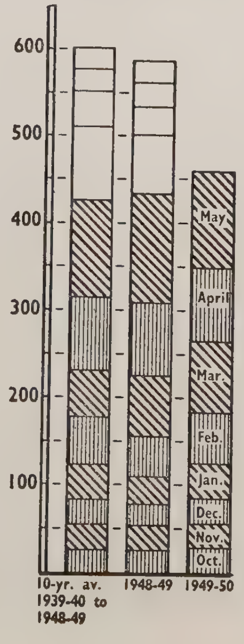


LIVESTOCK SLAUGHTERED AT MEAT EXPORT WORKS AND ABATTOIRS

Season Oct. 1 to Sept. 30: Order of months October to September reading upward in each column

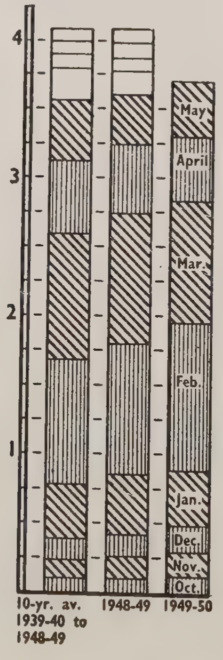
CATTLE

Thousands of carcasses



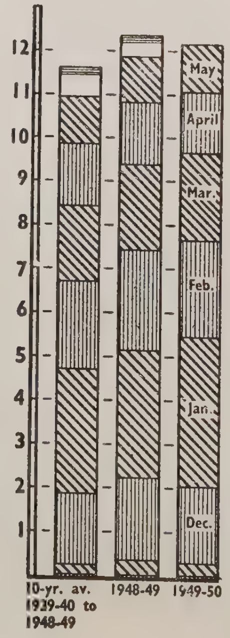
SHEEP

Millions of carcasses



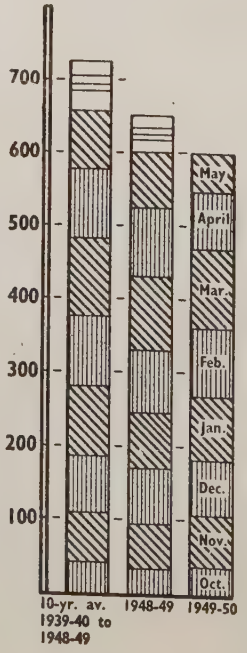
LAMBS

Millions of carcasses



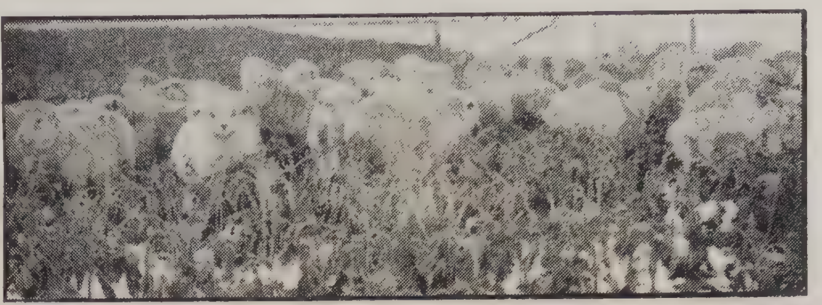
PIGS

Thousands of carcasses



The Place of Chou Moellier in Mid-Canterbury Farming

THOUGH chou moellier has not filled a very large place in general farm economy in Mid-Canterbury, it plays a very important part on farms where it is being used. It has its role as a substitute for rape or turnips where those crops cannot be depended on to establish, as a change of feed, or as an extra feed mixed in those crops. The cultivation and utilisation of chou moellier in Mid-Canterbury are the subject of this article by R. Inch, Fields Instructor, Department of Agriculture, Ashburton, who predicts that increasing use will be made of the crop.



Sheep grazing chou moellier after a fall of snow.

CHOU MOELLIER is a crop that deserves a larger place in the farming rotation in New Zealand. It can be sown from early spring to early summer and can be fed off over an even longer period. It provides a balanced ration of leaf and stem and can be used either for lamb fattening from January onward or for cattle or older sheep in autumn and winter. A number of farmers in Mid-Canterbury sow small areas to feed their house cows, and others milking for town supply grow a few acres for supplementary winter feed, but a far greater amount is sown either alone or with other crops for sheep feed. Methods and times of sowing vary from farm to farm and from district to district, and the time of feeding off probably varies to the same extent, depending on the season and the supply of other feed available.

Development of Varieties

Until recent years lines of chou moellier in New Zealand varied greatly. Some plants were short and leafy, some were tall and stemmy, and others showed many differences between these extremes. The late R. A. Calder worked for a number of years at the Agronomy Division, Department of Scientific and Industrial Research, selecting and breeding plants, and two distinct types were evolved, one with a medium length of stem and a considerable amount of leaf, the other with a long, thick stem and less leaf. After trials had been carried out seed of these varieties was sown under contract and the seed marketed as Certified Medium Stemmed and Certified Giant. It was felt that the Medium Stemmed would be more useful for sheep feed where a crop was to be fed off as it stood, the Giant type being more suitable for cattle, especially where it had to be carted out to another site for feeding. Each type has a place, and the farmer can now buy seed of the variety more suited to his needs.

Place in Farm Economy

Up to 1939 the area sown with chou moellier in Mid-Canterbury was not very large, but farmers were beginning to take more notice of its value. Because of the uncertainty of imports, when war was declared the Department of Agriculture took steps to produce seed in this country. The first area sown for Government Approved seed was harvested in 1942 and, possibly because of the publicity given to this effort, acreages sown for feed increased immediately.

During the winter of 1943 Mid-Canterbury experienced a severe snowstorm and more than a foot of snow lay over most of the district for about 10 days. Farmers fortunate enough to have a crop of chou moellier standing above the snow were able to feed their stock with little difficulty and their losses, if any, were very small. Many of their less fortunate neighbours experienced a great deal of trouble in feeding stock, and losses then and during lambing were fairly severe. Undoubtedly the value of chou moellier in such a year was one of the factors responsible for the greatly increased acreage in the following spring. Though that increase has not been maintained, the average quantity of seed sown in the district each year is now estimated at 3000 to 4000lb.

Chou moellier grows very well with a plentiful rainfall and on good soil, but it will also grow on light land and under fairly dry conditions. Indeed, the bulk of the crop is grown on the lighter land and in the drier areas. Its ability to withstand more adverse conditions than either rape or turnips makes it a safer crop on such areas.

Place in Rotation

Winter feed is very important and every endeavour should be made to grow it successfully. One of the factors limiting the number of stock carried on a farm is the amount of feed that can be provided to carry them successfully through the winter. During this time pasture growth is almost dormant, and only by the provision of extra feed in the form of hay, roots, or greenfeed can stock be fed adequately. A good crop of turnips or swedes undoubtedly gives the greatest amount of feeding, but in some districts, because of lack of moisture or the prevalence of club root, they are not reliable, and there chou moellier can take their place.

Chou moellier may be sown after all types of crops, but perhaps the best place in the rotation is after pasture. Land ploughed out of old pasture is usually in good heart and may be depended on to grow a good crop. After the chou moellier has been fed off, the land may be cultivated for a spring-sown crop or pasture, or be put through a summer fallow to clean up twitch, thistles, or other perennial weeds and sown down in pasture in autumn. In the wetter browntop districts where club root tends to be prevalent, but where the disease is not bad enough to prevent a turnip crop being grown, it is often advisable to grow two cleaning crops before sowing the land down. In this case turnips may be sown on the lea ground and followed the next year with chou moellier. The smothering effect of the two crops coupled with the grazing of the stock tends to check and weaken the growth of weeds. Any that are left can then be eradicated by a summer fallow.

Cultivation of the Seed-bed

The ultimate aim of cultivation is to prepare a seed-bed free from weeds and in good tilth—a condition that can seldom be achieved solely by mechanical means. Man may plough, disc, grub, and harrow, but in the long run the action of the weather on the soil is the deciding factor.

The land should be ploughed as early as possible to take advantage of weathering by rain, frost, and wind. On the free, lighter soils very early ploughing may not be necessary, but it should still be done in time to allow for the grubbing out of perennial weeds. When this has been done the field should be harrowed several times at fortnightly intervals to consolidate the ground and obtain a strike of annual weed seeds that may be in the topsoil.

On the stiffer clay soils, especially where browntop is prevalent, the land can be ploughed in early winter and left exposed to the action of the heavy frosts. In spring when conditions are suitable several strokes with the discs followed by the usual harrowing should give a good tilth on the surface without disturbing the turf below. If undisturbed, a considerable amount of this turf will rot while the crop is growing and being fed off, and any live plants remaining can be killed more readily the following year. In districts where spurry is prevalent the aim of top working should be to leave the surface as rubbly as possible.

Young plants of the Medium Stemmed (left) and Giant (right) types of chou moellier.

Like other brassicas, chou moellier requires a reasonably firm seed-bed, and the seed should not be sown too deeply. The earlier and more thorough the cultivation, the better the crop that may be expected.

Sowing the Seed

Small areas are sown in 21 or 28in. rows, either in ridges or on the flat, and intercultivated. On larger areas the seed is usually drilled in 7in. rows similarly to rape. Chou moellier areas are seldom sown down to grass at the same time, as the heavy growth of leaf has a smothering effect on other plant growths, but where that is done the rate of seeding is reduced considerably, 8oz. per acre usually being sufficient.

Times of sowing vary considerably according to the time that the feed is required. Where it is used to replace the rape crop it is planted at the end of September or in early October to be ready to be fed off in January. However, the bulk of the crop is sown between the middle of October and the end of November. No hard-and-fast rules are apparent, and sowings are also made during December, usually in the districts nearer the foothills.

Chou moellier is popular with some farmers for sowing as a mixture with swedes. The taller-growing chou moellier protects the swedes from insect attack and allows them to grow without check. An added advantage is that the extra leafage allows the mixture to be fed by a flock that includes old ewes whose mouths are not good enough to enable them to eat the harder roots.

As with turnips and rape, reverted or serpentine superphosphate is safer to use than straight superphosphate when sowing. Under dry conditions straight superphosphate tends to burn the seed, thus spoiling the germination. Equal quantities of lime and superphosphate mixed some days before application give equally good results; this mixture needs to be turned several times at intervals to prevent it setting.

Rates of seeding vary from 2 to 4lb. per acre when chou moellier is sown alone, but 2½lb. per acre appears to be general. When chou moellier and swedes are sown together the rate varies between 10oz. and 1½lb. of chou moellier and 6oz. and 1lb. of swedes. Quite often a few ounces of chou moellier seed is mixed with seed for a rape crop.

Utilisation

Chou moellier is a good, safe fodder crop and under reasonable conditions is capable of producing a heavy yield of nutritious and succulent feed. Though it does not have the quick fattening qualities of rape, it can replace this crop where the climate is not suitable for growing rape. However, its main value is in its ability to produce a large amount of autumn, winter, or early-spring feed.

Sheep are grazed on chou moellier as on rape or turnips. Cattle are sometimes grazed similarly, but usually the plants are cut and carted to another field for feeding.

Seed Production

For the production of seed chou moellier should be planted about the end of November, or in the colder areas early in December. Unlike rape, which runs to seed if planted in autumn, chou moellier demands a long growing season for seed production. Failure to recognise this fact may result in a large proportion of the crop failing to flower the following year. Crops sown for seed are not grazed.

In the early years of seed production in Mid-Canterbury, where all the Certified seed is grown, crops were cut with a binder, stooked, and threshed from the stook, usually by a header harvester travelling from stook to stook. Of recent years the binder has been discarded and most of the crops are now direct headed, a few being first windrowed and then picked up. The plant can withstand a fair amount of wind even when ripe, and though ripening may be somewhat uneven, the crop can usually be left until most of the plants are ready.

The seed should be bagged in quantities of 40 to 50lb. (fertiliser sacks are suitable) and hung on a fence similarly to ryegrass. If the sacks are filled loosely and turned occasionally for the first few days, the seed will dry out in the bags.

Late unseasonable frosts occasionally catch the crop in the seeding stage, with more or less serious results. A very severe frost will kill the young seed while leaving the pod apparently healthy on the outside. A lighter frost may affect only the pollination of the flowers that are mature at that time; when that occurs the very small seed capsules fall off before developing. The later flowers will not be affected, but will not seed in the normal way. Good pods will develop at the top of the stalk, followed by an empty space, then more seed pods.

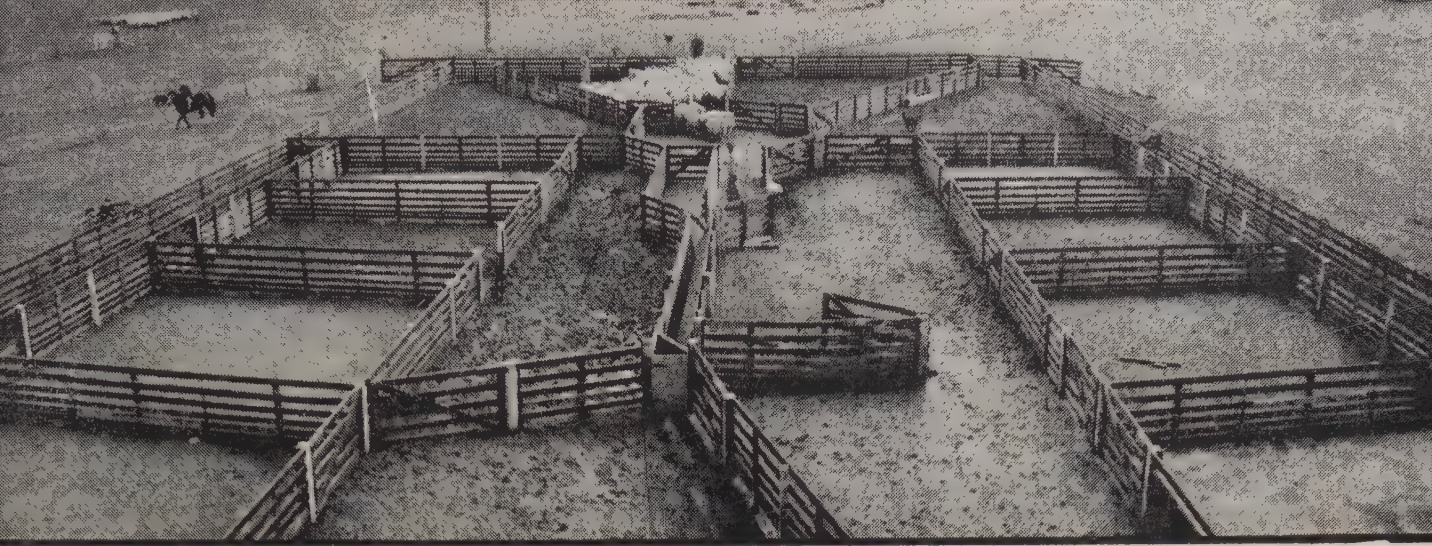
Pests and Diseases

Chou moellier is a hardy plant and usually is not attacked by pests or diseases. It can withstand drought to a great extent and is highly resistant to the effect of club root. It is less affected by aphis and diamond-backed moth than rape or turnips, and though it is occasionally badly attacked by diamond-backed moth, as were some young stands during last summer, generally no great damage is done.

Aphis appears to be more serious when the crop is running to seed. In a very dry spring the plants are weakened and the insects may seriously affect the seed yield. Again, it is usually a combination of adverse circumstances that causes the trouble. White butterfly does some harm, but serious damage is not usual.

Greater Use of Crop Expected

Chou moellier is finding a definite place in farming programmes and indications are that its use may be expected to increase. With the increased acreage being grown for seed, adequate supplies should be assured and farmers will be able to plan their crops with confidence. A few years may pass before sowings of this crop reach a more or less stable level, for there is plenty of scope for expansion.



Design and Construction of Sheep-drafting Yards

By J. E. DUNCAN, Wool Supervisor, Department of Agriculture, Wellington.

IN the first section of this article, which appeared in the July issue, it was stressed that there is no ideal sheep-drafting yard, and the six plans in this the third and final section of the article are included merely in an attempt to show the possibilities of certain arrangements and features. It is not intended that they should be followed slavishly, but that they should be used merely as a working basis which can be modified to suit individual needs. There is no reason why points from several of the designs should not be incorporated in a single set of yards. It must also be realised that in many cases a full complement of gates is included to show the potentialities of the layout, but a farmer in building the yards need not include all these and can simplify the design according to his own requirements.

BEFORE the plans are discussed short sections have been given on foot-rotting equipment and loading ramps. Though they are not strictly parts of drafting yards, they are often closely associated with them.

FOOT-ROT TROUGHS AND BATHS

Although the ideal would be to have foot-rotting equipment well away from the main yards, it is now common practice to include in the yards or woolshed a trough or bath to hold the liquid, usually a strong solution of bluestone or formalin, used in the treatment of foot-rot. This equipment can range from a simple trough through which the sheep walk in single file to the elaborate layout shown in Fig. 24 on this page.

The main requirement in eradicating foot-rot is thorough trimming and paring of the overgrown horn of the hooves. Without this, treatment with any solution or other medicament is largely a waste of effort and time. When the feet have been properly trimmed and cleaned up it is necessary to have the hoof immersed in the bluestone or formalin for only a comparatively short period. W. I. B. Beveridge, the Australian research worker who first placed the treatment of foot-rot on a sound and scientific basis, says that as little as 10 seconds is sufficient time of immersion, **provided the hoof has been properly trimmed and that the bluestone is a strong (30 per cent.) solution.**

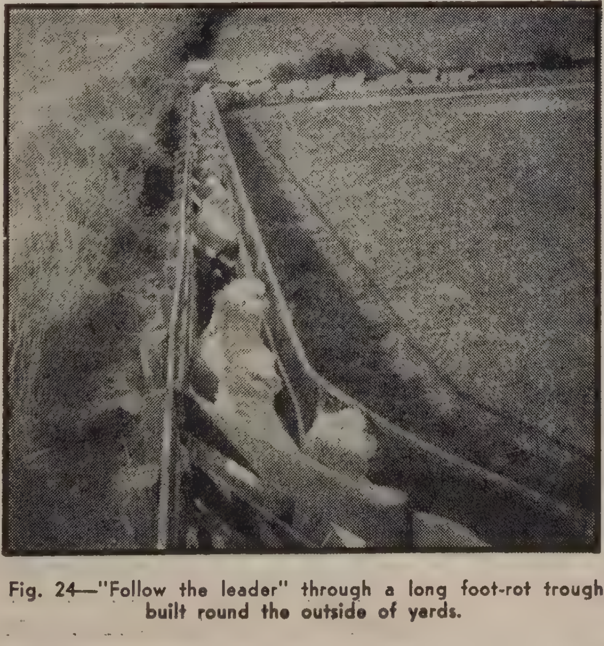


Fig. 24—"Follow the leader" through a long foot-rot trough built round the outside of yards.

If hooves are trimmed in the woolshed, working conditions are better for the men concerned than if trimming is done in a hot, dusty yard, and there is the added advantage that after passing over the battens the feet of sheep are cleaner and easier to deal with. Numbers of farmers do the whole operation under cover by having foot-rot troughs installed as integral parts of their woolsheds. The sheep return to the grating floors after passing through the trough and are kept there until the feet are dry before being returned to the paddocks.

Most installations are in or attached to the yards and usually take the form either of a race with a trough at the bottom or a small pen with a watertight concrete floor with raised edges which can be used to hold the solution. The choice between these two main methods seems to be one largely of personal preference, although frequently the layout of the existing yards may be the determining factor.

It would be much better to keep affected sheep away from the yards, where they will contaminate a number of pens and make it easy to reinfect clean sheep, but if this cannot be arranged, the whole flock should pass through the bluestone each time as a preventive measure. Some farmers use portable wooden troughs for bluestone treatment and erect temporary netting pens so that treatment can be carried out on the spot

Look ahead!

THE HAY-MAKING SEASON IS FAST APPROACHING AGAIN

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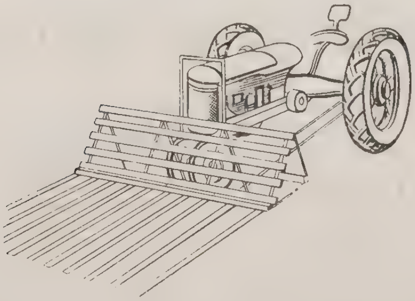

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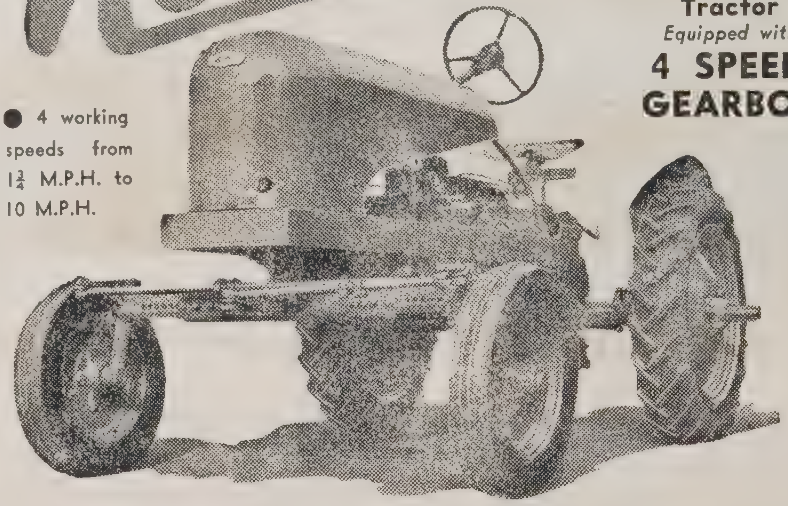

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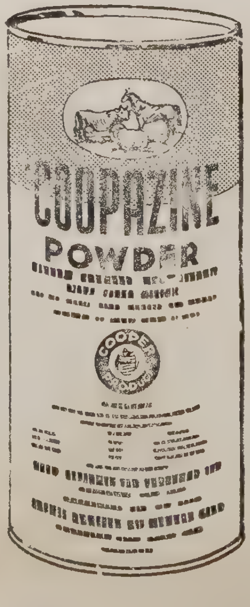

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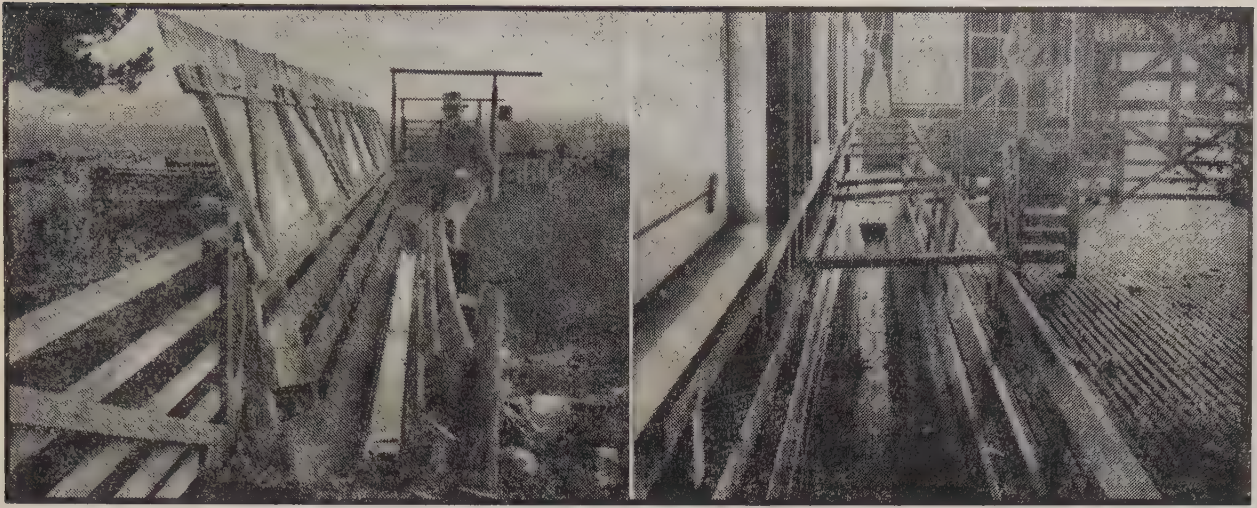

Fig. 25 (left)—Foot-rot trough built at one end of yards; there is a hinged lid to keep out rain. Fig. 26 (right)—Foot-rot trough built into woolshed floor. When the trough is not in use it is covered with a hinged lid and the light hurdles are folded up against the wall.

in the paddocks where infected sheep are held. This system has much to recommend it.

Troughs

At times foot-rot troughs are at the bottom of the drafting race and covered over with a hinged or removable wooden lid when not in use. Though this method is quite a workable one, it cannot altogether be recommended for reasons already given and also because it is inclined to be bad "sheep psychology", giving them a special dislike of going through the race, which does not make normal drafting any easier. Although troughs vary a good deal in size and shape, an average size for this type of trough seems to be about 6in. wide at the bottom, 12in. wide at the top, and 6 to 7in. deep. Some farmers recommend a rounded rather than a flat bottom and others a series of ridges running along the bottom from end to end, on the principle that these devices will tend to make a lame sheep use all four feet to keep its balance and prevent it walking through on three legs. Concrete is the best material for a trough. If wood is used, it must be remembered that because bluestone has a very corrosive action on steel, the nails, screws, or hinges should be of brass or copper. If the race is a short one, provision should be made to hold sheep in it by a stop-gate or hurdle.

Baths

Where large numbers of sheep are being handled and a trough may be inadequate a pen holding from 10 to 50 sheep is usually employed. The foot-rot solution should be 2 or 3in. deep to cover the hoof well, and it is not unusual to place wool on the floor of this pen or to float straw on the surface to prevent undue splashing and staining of the wool. If the solution is to be kept for some time, provision must be made to prevent its dilution with rain-water either by roofing over the pen or by running the solution into a container when the pen is not in use.

A very ingenious arrangement has been evolved by Mr. F. P. Cookson, a Canterbury farmer, and is shown in Fig. 28 below. He has arranged a concrete sump at one end of the foot-rot bath large enough to hold all the bluestone required (about 44

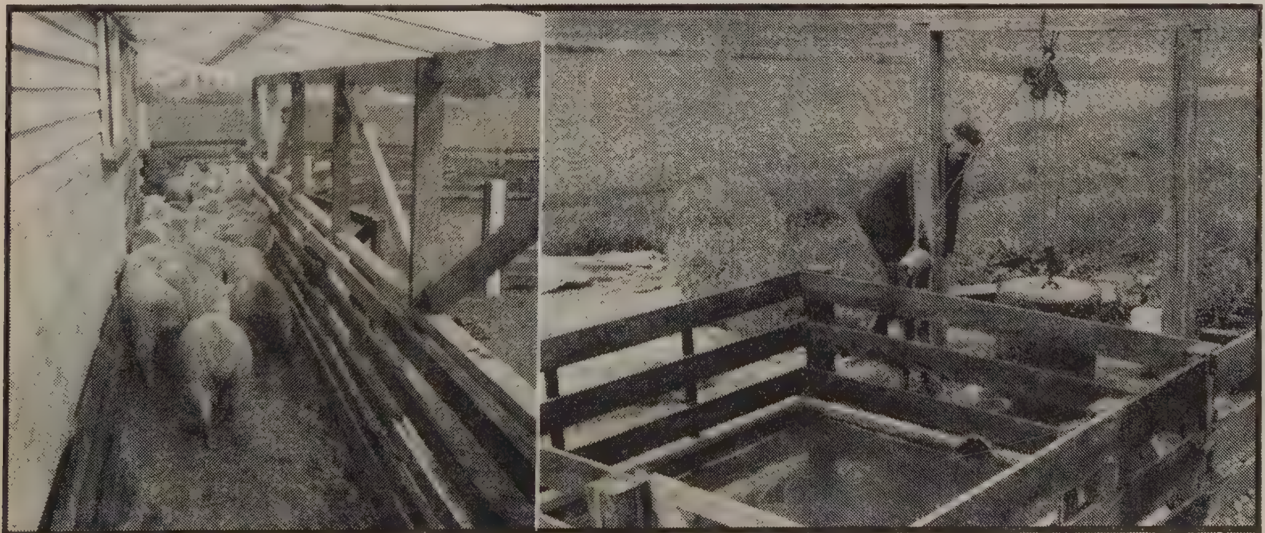

Fig. 27 (left)—A foot-rot bath of large capacity. Fig. 28 (right)—Foot-rot bath which can be filled or emptied quickly by lowering or raising the heavy log in the adjacent sump.

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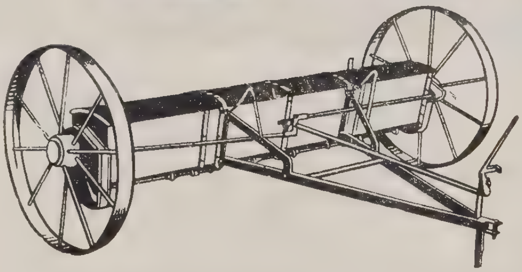

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	Sowing Width	Wheel Tread	Overall Width
7-plate:	7ft. 6in.	8ft. 4in.	8ft. 10½in.
8-plate:	8ft. 6in.	9ft. 4in.	9ft. 11in.

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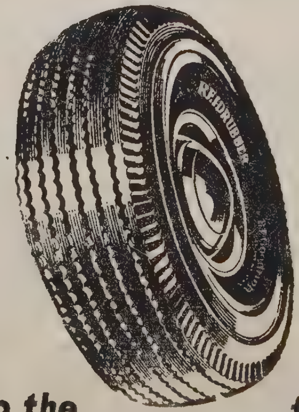

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gallons), and as the floor of the bath has a slight fall to this end, the liquid naturally drains into the sump. Over the sump is suspended a heavy wooden block and when this is lowered by a rope and hand windlass it almost completely fills the sump, displacing the bluestone solution, which flows out to fill the bath once more. The block does not float because it is a good deal longer than the sump, thus giving it sufficient total weight to sink it to the bottom. It is a simple and fairly quick procedure either to fill or empty the bath, and there is little to get out of order. This design keeps knocking about of sheep to a minimum, and bluestone staining of the wool is practically eliminated. Such an arrangement means that, if necessary, a pen in frequent use, such as one of the crush pens, can be used as a foot-rot bath, because it can readily be emptied when required for its legitimate purpose, yet the bluestone solution is immediately available when required again. A perforated copper or brass strainer should be provided at the entrance to the sump to prevent droppings and other dirt finding their way in, and a wooden plug or other means is required to prevent the entry of rain-water from the pen to the sump. Where a crush pen is being used to hold the bluestone it is also desirable to close board the bottom for a few inches up and to keep these boards inside the concrete rim to prevent undue loss of solution by splashing.

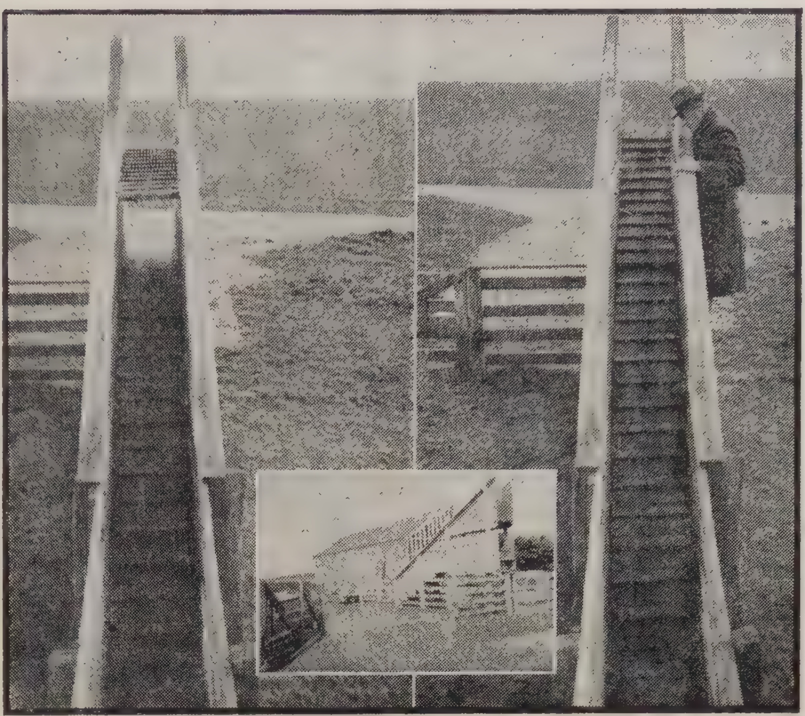

Fig. 30—2-way loading ramp. Left—Gangway up, to load from bottom deck. Right—Gangway down, to load from top deck. Inset—Side view of ramp.

At times it has been recommended that sheep should be passed through a trough or pen containing water to clean their feet before entering the bluestone. Some farmers even go to the length of putting rounded pebbles about the size of pigeon's eggs in the section containing the water, with the idea of opening up the claws of the hoof and getting out the dirt. Though these ideas are sound enough, both in theory and practice, they are no substitute for thorough and conscientious trimming of the hooves; a water wash by itself will do little good if the trimming has been omitted.

LOADING RAMPS

Ramps for loading sheep and lambs on to motor trucks are usually so arranged that they can be fed either from the woolshed or the yards. They are nearly always made to suit double-decked trucks, but there is no standard design. In the illustrations reproduced on this page and page 233 three different ways of accomplishing the same result are shown. Fig. 31 shows a double ramp where top and bottom decks may be loaded separately by use of the gate in the foreground. Fig. 29 shows a type where the ramp is made to lift like a ship's gangway and is counter-balanced by the drums of stones. In the top position it rests on a steel rod or pipe slipped through the rings let into the posts. The decking consists of 6in. x 1in. planks running across the floor and overlapped like weatherboarding to give a non-slip surface. The ramp is approximately 10ft. long, 18in. wide inside, and about 2ft. 9in. deep.

Fig. 30 gives different views of a type of ramp in which part of the floor hinges up to give access to the bottom deck of the truck or when in position gives direct access to the top deck. The loose section of floor is 6ft. 10in. long and is pivoted at its forward end on a piece of ½in. water pipe. The whole structure is 15ft. long and 9ft. 6in. high over-all and forms an extension of the drafting race which is used very effectively for feeding it. The inside measurement of the ramp is 16in. and the depth 2ft. 11in. The lower loading ramp finishes at 4ft. from the ground and the upper one about 6ft. 9in. These heights cannot be laid down as standard, because the chassis measurements and deck heights of different makes of trucks vary considerably, which is the reason why transport operators always carry on the truck a

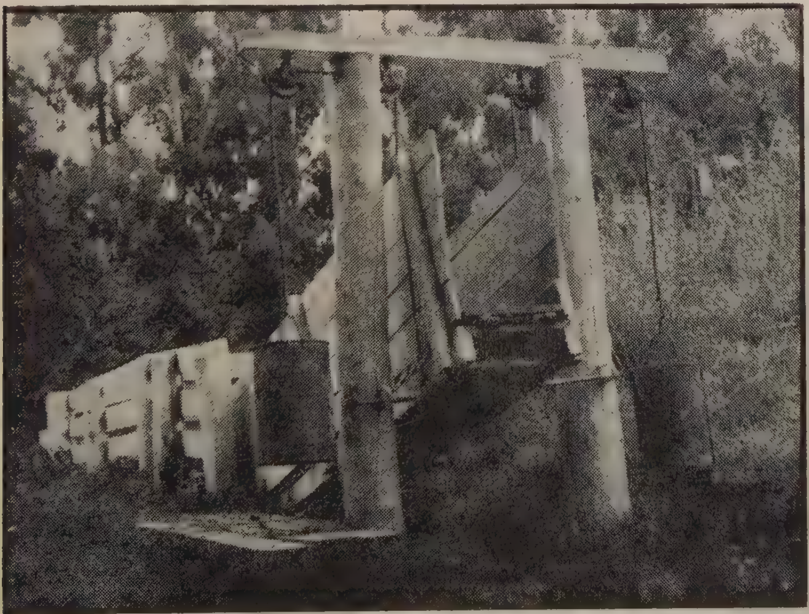

Fig. 29—An adjustable loading ramp.

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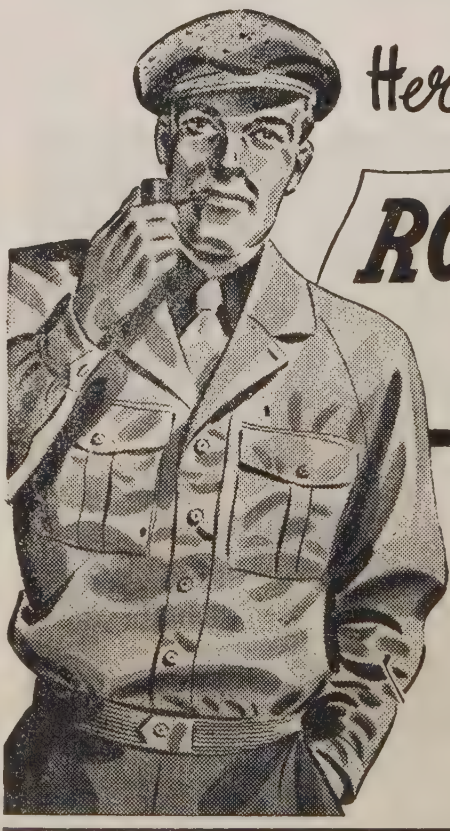

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short ramp and sides, which are used to connect up with whatever the sheep are being loaded from or into. The heights given are about an average which will suit most trucks.

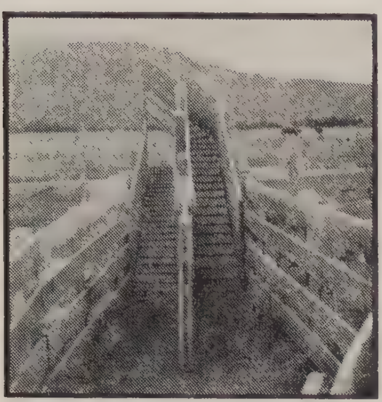


Fig. 31—Double loading ramp.

SELECTED SHEEPYARD PLANS

The figure used throughout this article in calculating the capacity of yards has been 5 sq. ft. per sheep, except in the case of crush pens, where 4 sq. ft. is sufficient. It would therefore be easy to give the approximate sheep capacity of any set of yards by finding the total area in square feet and dividing by five. This, however, would not give the number of sheep the yards could be expected to handle, as some pens must be left empty for a start before sheep can be moved around in the yards. Then again a comparatively small set of yards used in conjunction with two or three small holding paddocks can handle thousands of sheep; in fact there would be no upper limit, provided sufficient time was available for the job. To compromise, therefore, and make use of a figure which bears some relationship to actual working conditions the capacity of each set of yards has been taken on the basis of the main receiving yards plus one or more of the forwarding pens—usually a figure approximately half the total area of the yards—and this has been expressed as the number of sheep which yards will handle comfortably.

The position of the gates in the outside fences of the various yards illustrated is determined to a large extent by the location of existing paddock fences when the yards are built. The ones shown in the plans, therefore, are merely suggestions and may have to be modified according to existing circumstances.

The aim throughout in presenting these plans has been to incorporate variety and show different ways in which certain objectives can be achieved. That is why certain gates may be shown in, say, the crush pen in one plan yet are not repeated in other plans, where some other novel features will be depicted instead.

Estimates of Quantities and Costs

In the estimates which are given with each plan the quantities have been subdivided to some extent to give a prospective builder some idea of how much material is required for each part of the yards, so that if modifications to the plans are to be made they can be more readily allowed for.

With prices still generally rising at present it is unlikely that the prices quoted will be accurate for long, but adjustments to current rates on the quantities given can readily be made. No allowances have been made for either labour or cartage costs, as these are unpredictable.

No. 1 Plan

The keynote of No. 1 Plan (small yards to handle about 250 sheep) is simplicity, yet convenience is not sacrificed to economy. A double crush pen and 3-way drafting have been included. Features to note are:—

The four gates (1, 2, 3, and 4) arranged at the entrance to the receiving pens A and B. These allow stock to be shifted in or out with the maximum convenience.

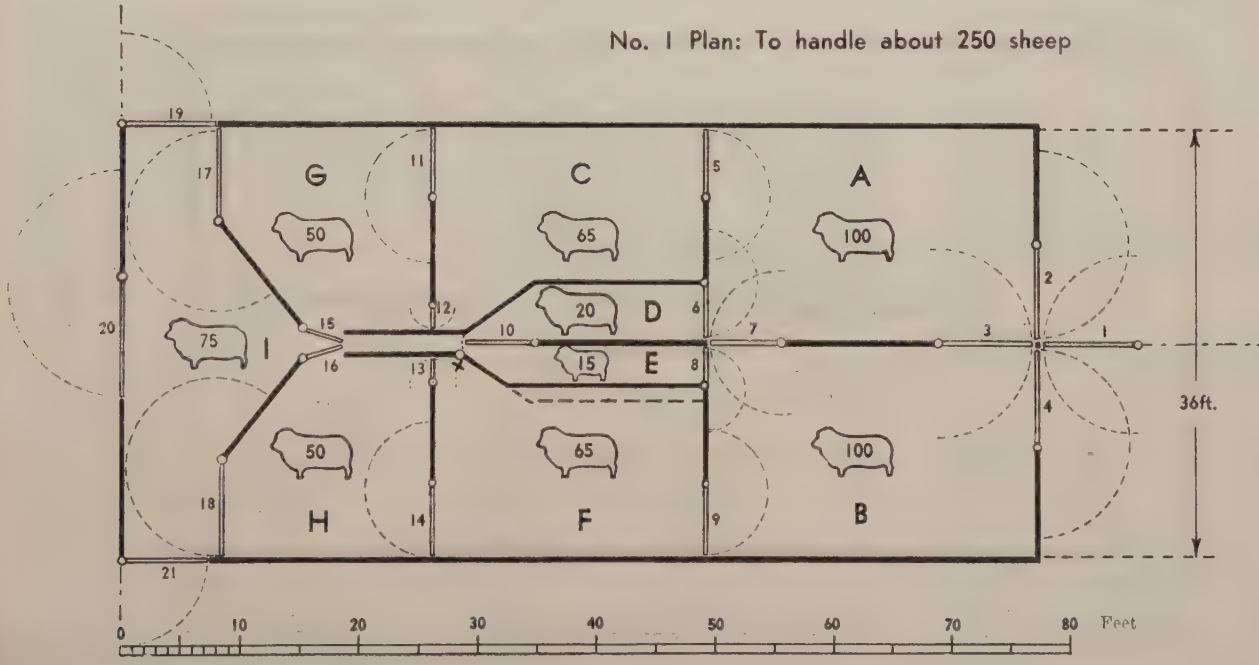
The same general principle applies to the arrangement of gates 6, 7, and 8, at the entrance to the crush pens. Thus sheep can be taken direct from B to E, but if required they can also be shifted from B to D by opening gates 6 and 7 and fixing them together.

The crush in this design may be a single pen, twin crush pens of equal size (as shown by the dotted line), or two pens of different sizes as shown in the actual plan, where D is 4ft. 6in. wide and E is 3ft. wide. With the last design E, being narrower, is very suitable for dosing sheep or similar jobs where one man is working on his own. A roller is provided at the entrance to the drafting race at X to help prevent sheep jamming.

The race is 10ft. long and in the interests of efficiency should not be made any shorter than this, nor should the two drafting gates 15 and 16 be made any less than 3ft. 6in. in length. The small 2ft. swing gates shown at 12 and 13 should be noted. They allow the man on the drafting gates (whether right- or left-handed) to get down to the end of the crush rapidly if a stoppage occurs. To this end it is advisable to keep these gates small and fit them with self-closing springs so that they may be opened in either direction but will always close themselves.

The arrangement of the gates at 17, 18, 19, and 21 should be noted; they allow sheep to be moved in various ways between pens and paddock and vice versa.

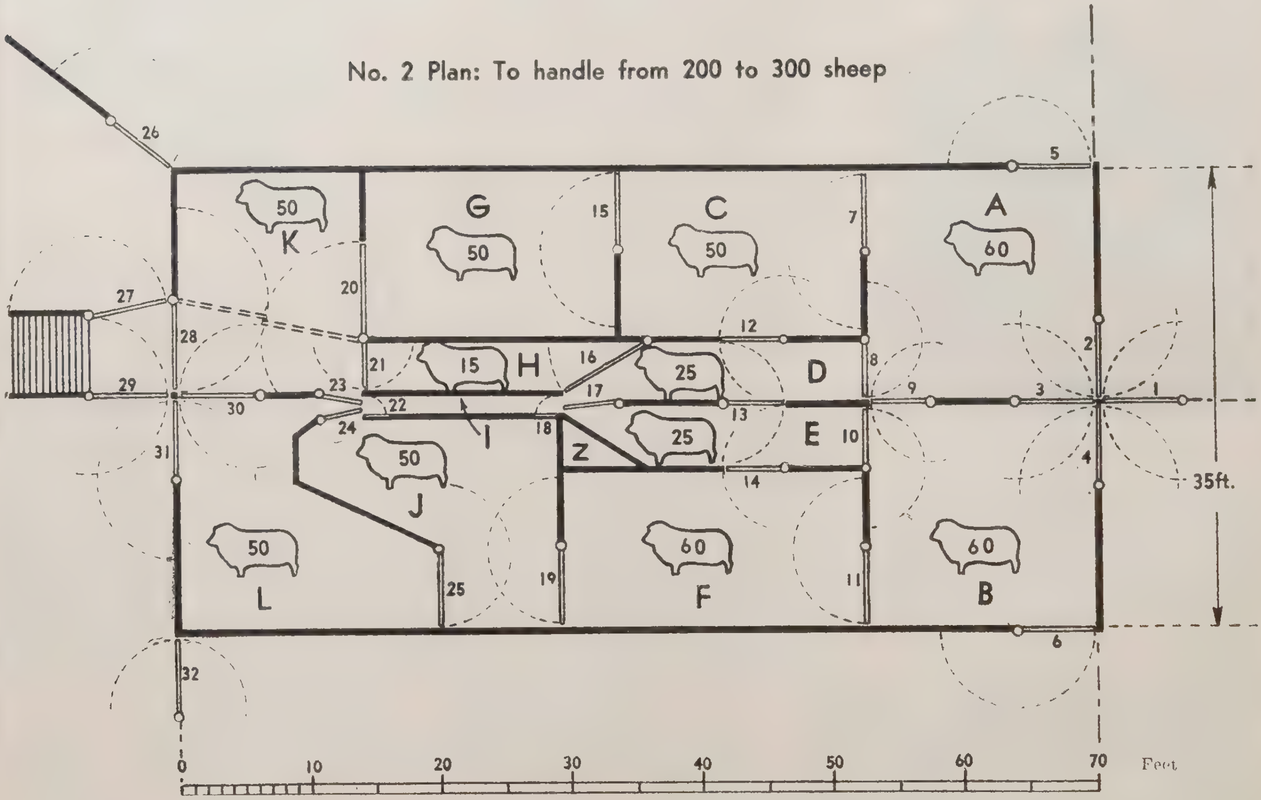
The purpose of the 10ft. gate (20) is to allow a lorry to be backed in



No. 1 Plan: To handle about 250 sheep

PLANS OF SHEEP-DRAFTING YARDS

No. 2 Plan: To handle from 200 to 300 sheep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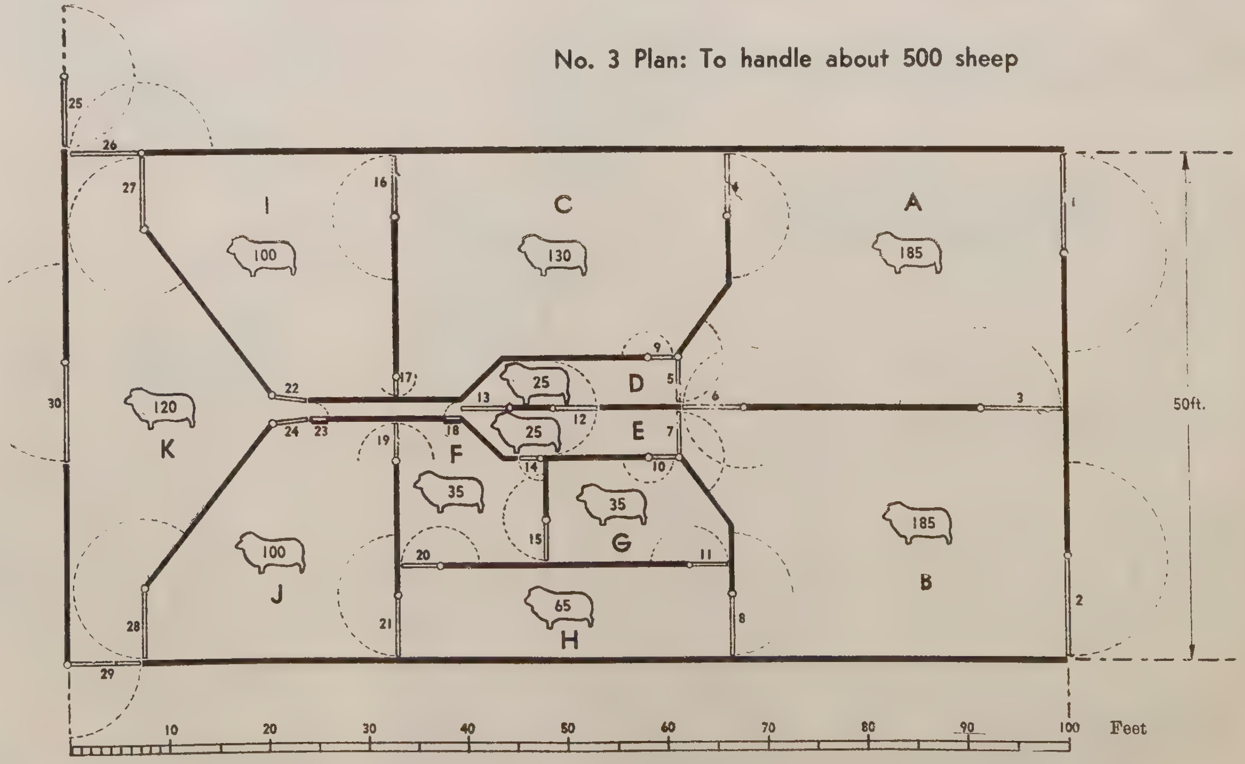
No. 3 Plan: To handle about 500 sheep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90
100
Feet

opposite the end of the drafting race so that the crush pens and race can be utilised for loading. This does away with the need for any special loading ramp, which is often a feature of large sets of yards.

Estimates of Quantities and Costs: No. 1 Plan

Fences

	ft.
Length of outer fence	186
Length of inner fences	137
Length of all fences (excluding gates)	323

If five 4in. x 1¼in. rails are used for fences, a total of 323 x 5 = **1615 lineal feet** of this timber will be required.

Crush and Race

End panels of crush on both sides are close boarded with single-dressed 6in. x 1in.'s = 12ft. 6in. x 6 = **75 lineal feet.**

Sides of race are close boarded with single-dressed 6in. x 1in.'s = 20ft. x 6 = **120 lineal feet.**

* If drafting gates are constructed of double-dressed 6in. x 1in. timber, add **42 lineal feet** plus **24 lineal feet of 4in. x 1in.** (dressed) for stiles.

Gates

If common swing gates are constructed, the following timber will be required:—

For 1 x 10ft., 8 x 8ft., 6 x 6ft., 1 x 4ft. 6in., 1 x 3ft., 2 x 2ft. gates a total of **925 lineal feet of 4in. x 1in.** timber for stiles and stays of all gates, and rails of gates under 7ft., plus **370 lineal feet of 4in. x 1¼in.** timber for rails of gates 7ft. or wider.

Total timber (lineal feet): 1985 of 4in. x 1¼in., 949 of 4in. x 1in., 237 of 6in. x 1in.

Posts

A total of 65 posts will be required and of these at least 18 require to be heavy enough to act as gateposts.

Cost

For ease in calculation the quantities of timber have been given in lineal or running feet, but have been converted to superficial feet for assessing costs. Prices are based on the use of *Pinus radiata*, which is often the only timber available, and 50s. per 100 super ft. represents an average taken over a number of districts. If better-quality timber is used, an adjustment will have to be made. Posts are taken at £38 per 100.

Timber

super ft.	in.	in.	At per 100 super ft.	£	s.	d.
827	4 x	1¼	£2 10 ..	20	13	6
317	4 x	1	£2 10 ..	7	18	6
119	6 x	1	£2 10 ..	2	19	6
65 posts at £38 per 100 ..				24	14	0
Approx. 300 ⅜in. x 3½in. to 4½in. black bolts and nuts at average of 15s. per 100				2	5	0
Approx. 300 ⅜in. washers at 2s. 9d. per gross					6	0
21 pairs hinges and gudgeons at average of 7s. 6d. per pair				7	17	6
Estimated cost				£66	14	0

Sundries

No special provision has been made for gate fasteners, as sufficient 4in. x 1in. timber has been allowed for slide fasteners. If other types of fasteners are to be used, allowance must be made for these and for such materials as wire, staples, nails, creosote, etc., the cost of which cannot be accurately predicted.

* If drafting gates are constructed on the laminated principle (3 layers) to give a flush, smooth finish, a total of 120ft. of 6in. x 7/16in. finish dressed timber will be required instead of the 42ft. of 6in. x 1in. and 24ft. of 4in. x 1in.

No. 2 Plan

Although slightly smaller than the previous plan, the set of yards shown on No. 2 Plan (small yards to handle 200 to 300 sheep) is considerably more complex and has been designed deliberately to show the full potentialities of a small set of yards. It is only by the inclusion of a fairly large number of gates that maximum ease and convenience of working can be attained. There is no reason why the design should not be simplified to meet individual requirements.

As far as is practicable the sizes of the various pens have been designed on the "multiple" system; that is, the crush pens D and E are designed to hold approximately 50 sheep and the small pens C, G, K, J, and L each hold approximately 50 sheep, which leads to convenience in drafting.

The Run-through

The run-through which consists of a long, narrow alleyway (H) parallel with the drafting race (I) is a useful adjunct in any set of yards and is a handy short cut between certain pens and also serves as a direct right-of-way to the woolshed when gates 20 and 28 are swung across to meet as shown by the dotted lines and gate 16 (which forms the end of one of the crush pens) is opened back. For best results this gate should swing into a recess so that it lies flush with the wall of the pen, as should 18 and 22, the stop-gates at the ends of the drafting race.

The three gates in the centres of the crush pens (12, 13, and 14), though not essential, are a great convenience, allowing sheep to be by-passed between pens D and E and also subdividing the crush pens into three smaller pens when they are opened. The space at Z can be used for a variety of purposes; for example, as a site for a small shed for storing equipment or as a small pen, in which case it can be fitted with one or more gates.

The two systems of four gates both at the entrance to the yards and at the exit allow sheep to be moved conveniently in a number of different ways as already described in the case of Plan No. 1.

Estimates of Quantities and Costs: No. 2 Plan

Fences

	ft.
Length of outer fence	173
Length of internal fences	143
Length of all fences (excluding gates)	316

If five 4in. x 1¼in. rails are used for fences, then a total of 316 x 5 = **1580 lineal feet** of this timber will be required.

Crush and Race

End panels of the crush on both sides are close boarded with single-dressed 6in. x 1in.'s = 16ft. x 6 = **96 lineal feet.**

N.B.: One of these panels is hinged as a gate.

Sides of race are close boarded with single-dressed 6in. x 1in.'s = 30ft. x 6 = **180 lineal feet.**

* If drafting gates and race stop-gates are constructed of double-dressed 6in. x 1in. timber, add **60 lineal feet,** plus **56 lineal feet of 4in. x 1in.** (dressed) for stiles, and stiles and stays of hinged end panel of crush.

Gates

If common swing gates are constructed, the following timber will be required:—

For 2 x 7ft. 6in., 17 x 6ft., 1 x 5ft., 6 x 4ft. 6in., 1 x 4ft. gates a total of **1597 lineal feet of 4in. x 1in.** timber for stiles and stays of all gates, and rails of gates under 7ft., plus **75 lineal feet of 4in. x 1¼in.** timber for rails of gates 7ft. or wider.

Total timber (lineal feet): 1655 of 4in. x 1¼in., 1653 of 4in. x 1in., 336 of 6in. x 1in.

Posts

A total of 75 posts will be required and of these at least 27 require to be heavy enough to act as gateposts.

Cost

The same general remarks apply as for No. 1 Plan.

Timber

super ft.	in.	in.	At per 100 super ft.	£	s.	d.
690	4 x	1¼	£2 10 ..	17	5	0
551	4 x	1	£2 10 ..	13	15	6
168	6 x	1	£2 10 ..	4	4	0
75 posts at £38 per 100 ..				28	10	0
Approx. 504 ⅜in. x 3½in. to 4½in. black bolts and nuts at average of 15s. per 100				3	15	8
Approx. 504 ⅜in. washers at 2s. 9d. per gross					9	8
30 pairs hinges and gudgeons at average of 7s. 6d. per pair				11	5	0
Estimated cost				£79	4	10

Sundries

As for No. 1 Plan.

* If drafting gates are constructed on the laminated principle (3 layers) to give a flush, smooth finish, a total of 120ft. of 6in. x 7/16in. finish dressed timber will be required instead of the 42ft. of 6in. x 1in. and 24ft. of 4in. x 1in.

No. 3 Plan

No. 3 Plan (medium yards to handle about 500 sheep) is a fairly straightforward design which can be enlarged if necessary to handle quite large flocks.

If the three small pens F, G, and H are not required, the subdivisions can be left out, making one large pen corresponding to C.

Another feature to note is the provision of four extra gates (9, 10, 12, and 14) in the two crush pens. The three small ones are a convenience for drafting out odd sheep without the necessity of putting them through the race. The communicating gate (12) between the two pens is also valuable.

The placing of gate 6 at the entrance to the double crush enables sheep to be taken from A to E and from B to D if required instead of straight ahead by the more usual routes. The 10ft. gate (30) is again provided as in No. 1 Plan so that a lorry can be backed in for loading sheep and lambs direct from the drafting race.

Estimates of Quantities and Costs: No. 3 Plan

Fences	**ft.**
Length of outer fence	256
Length of inner fences	473
Length of all fences (excluding gates)	729

If five 4in. x 1¼in. rails are used for fences, a total of 729 x 5 = **3645 lineal feet** of this timber will be required.

Crush and Race

End panels of the crush on both sides are close boarded with single-dressed 6in. x 1in.'s = 12ft. x 6 = **72 lineal feet.**

Sides of the race are close boarded with single-dressed 6in. x 1in.'s = 30ft. x 6 = **180 lineal feet.**

* If drafting gates and race stop-gates are constructed of double-dressed 6in. x 1in. timber, add **60 lineal feet,** plus **36 lineal feet of 4in. x 1in.** (dressed) for stiles.

Gates

If common swing gates are constructed, the following timber will be required:—

For 3 x 10ft., 1 x 8ft., 5 x 7ft., 5 x 6ft., 1 x 5ft., 3 x 4ft. 6in., 4 x 4ft., 2 x 2ft. 6in., 2 x 2ft. gates, a total of **1260 lineal feet of 4in. x 1in.** timber for stiles and stays of all gates, and rails of gates under 7ft., plus **365 lineal feet of 4in. x 1¼in.** timber for rails of gates 7ft. or wider.

Total timber (lineal feet): 4010 of 4in. x 1¼in., 1296 of 4in. x 1in., 312 of 6in. x 1in.

Posts

A total of 101 posts will be required, and of these 27 require to be heavy enough to act as gateposts.

Cost

The same general remarks apply as for No. 1 Plan.

Timber

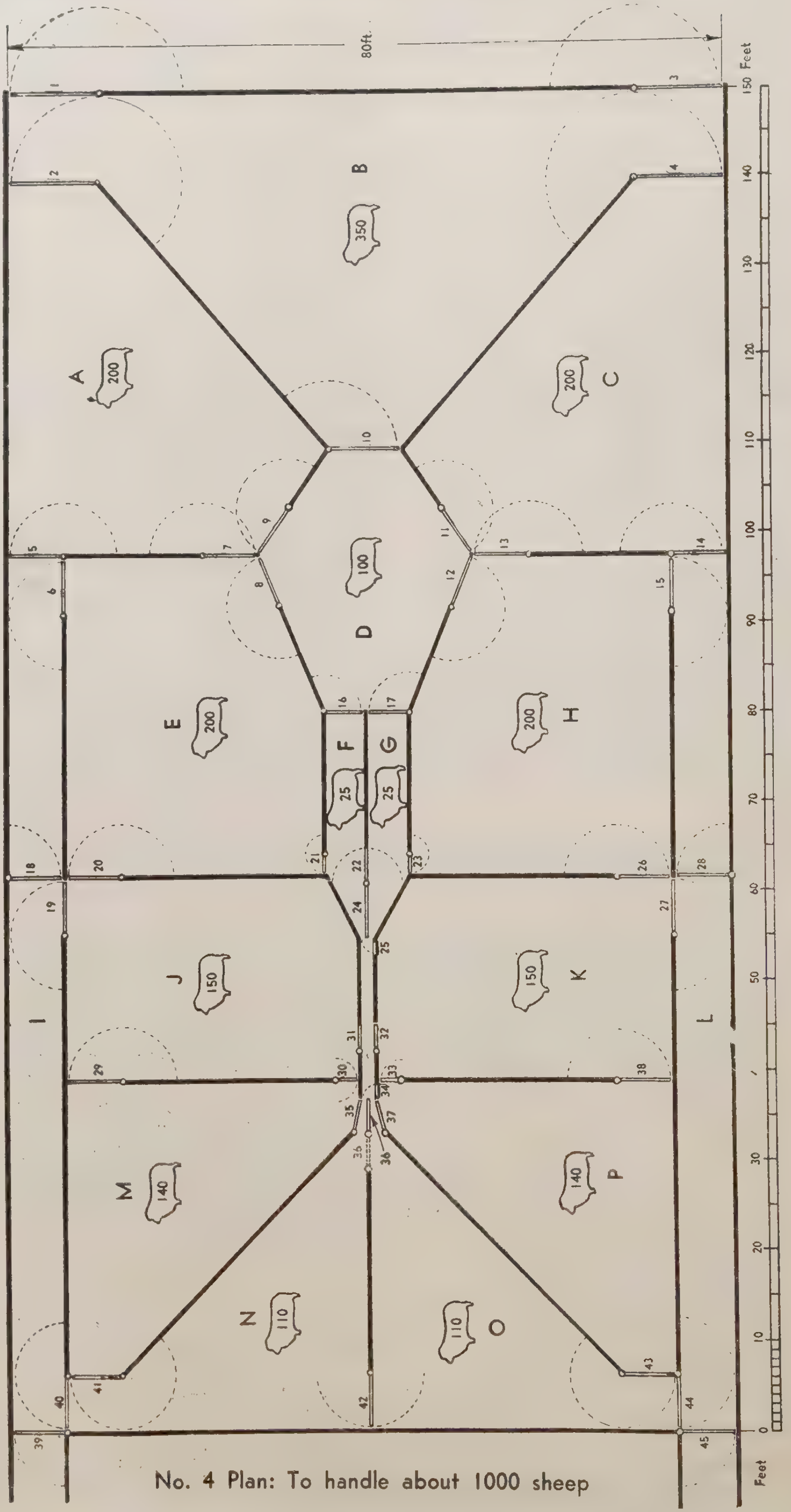
super ft.	**in. in.**	**At per 100 super ft.**	**£**	**s.**	**d.**
1671	4 x 1¼	£2 10 ..	41	15	6
432	4 x 1	£2 10 ..	10	16	0
156	6 x 1	£2 10 ..	3	18	0
101 posts at £38 per 100 ..			38	7	7
Approx. 500 ⅜in. x 3½in. to 4½in. black bolts and nuts at average of 15s. per 100			3	15	0
Approx. 500 ⅜in. washers at 2s. 9d. per gross				9	8
28 pairs of hinges and gudgeons at average of 7s. 6d. per pair			10	10	0
Estimated cost ..			£109	11	9

Sundries

As for No. 1 Plan.

---

* If drafting gates are constructed on the laminated principle (3 layers) to give a flush, smooth finish, a total of 120ft. of 6in. x 7/16in. finish dressed timber will be required instead of the 42ft. of 6in. x 1in. and 24ft. of 4in. x 1in.



No. 4 Plan: To handle about 1000 sheep

No. 4 Plan

The main feature of No. 4 Plan (medium yards to handle about 1000 sheep) is that with the race and gates shown sheep can be drafted six ways. Of course it may be asserted that this is quite unwarranted in a yard of this size, but it is included to show the general arrangement required.

The gates 35, 36, and 37 give 4-way drafting and by stationing a second man at the gates 31 and 32 sheep may be drafted off two additional ways into pens J and K. If a simpler set of yards is required, gates 31, 32, and 36 may be omitted, giving normal 3-way drafting. In this case the division between pens N and O would be eliminated and they would be joined into one large pen holding 220 sheep. If it is felt that this would be too large, the end of the yard could be moved in a little to give smaller drafting pens.

Another and in some ways a better method of arranging for 3-way drafting is to retain gate 36 but to hang it about 3ft. 6in. further back in the position shown dotted in on the plan. Then the free end of this gate will swing over to the fence on either side (just behind the gateposts of 35 and 37) so that when it is fastened one way sheep may be drafted into pens M, N, and P; and when it is fastened the other way they will go into M, O, and P. Should the farmer decide to follow this arrangement in the first instance, it will be advisable to have the gateposts of 35 and 37 somewhat closer together than as shown for 4-way drafting.

Another useful feature is the provision of the two alleyways I and L. These serve as right-of-ways connecting the various pens and greatly facilitate the moving of sheep. They may also be used as lead-ins to the woolshed and the dip where this can be arranged conveniently. As an alternative a small concreted section could be closed off by gates and could be used as a foot-rot bath or for feeding a foot-rot trough outside the yards.

The small gates 21, 22, and 23 in the crush pen, though by no means essential, are a great convenience in moving odd sheep around.

Estimates of Quantities and Costs: No. 4 Plan

Fences

	ft.
Length of outer fence	428
Length of fence round diamond	43
Length of other internal fences ..	533
Length of all fences (excluding gates)	1,004

If five 4in. x 1¼in. rails are used for fences then a total of 1004 x 5 = **5020 lineal feet** of this timber will be required.

Crush and Race

End panels of the crush on both sides are close boarded with single-dressed 6in. x 1in.'s = 17ft. x 6 = **102 lineal feet.**

Sides of race are close boarded with single-dressed 6in. x 1in.'s = 30ft. x 6 = **180 lineal feet.**

* If drafting gates and race stop-gates are constructed of double-dressed 6in. x 1in. timber, add **120 lineal feet,** plus **60 lineal feet of 4in. x 1in.** (dressed) for stiles.

Gates

If common swing gates are constructed the following timber will be required:—

For 4 x 10ft., 1 x 8ft., 26 x 6ft., 3 x 4ft. 6in., and 4 x 2ft. gates a total of **2197 lineal feet of 4in. x 1in.** timber for stiles and stays of all gates, and rails of all gates 7ft. and under, plus **240 lineal feet of 4in. x 1¼in.** timber for rails of gates 7ft. or wider.

Total timber (lineal feet): 5260 of 4in. x 1¼in., 2257 of 4in. x 1in., 402 of 6in. x 1in.

Posts

A total of 180 posts will be required and of these at least 45 require to be heavy enough to act as gateposts.

Cost

The same general remarks apply as for No. 1 Plan.

Timber

super ft.	in.	in.	At per 100 super ft.		£	s.	d.
2192	4 x	1¼	£2 10	..	54	16	0
753	4 x	1	£2 10	..	18	16	6
201	6 x	1	£2 10	..	5	0	6
180 posts at £38 per 100				..	68	8	0
Approx. 740 ⅜in. x 3½in. to 4½in. black bolts and nuts at average of 15s. per 100				..	5	11	0
Approx. 740 ⅜in. washers at 2s. 9d. per gross ..				..		14	3
43 pairs hinges and gudgeons at average of 7s. 6d. per pair ..				..	16	2	6
Estimated cost ..				..	£169	8	9

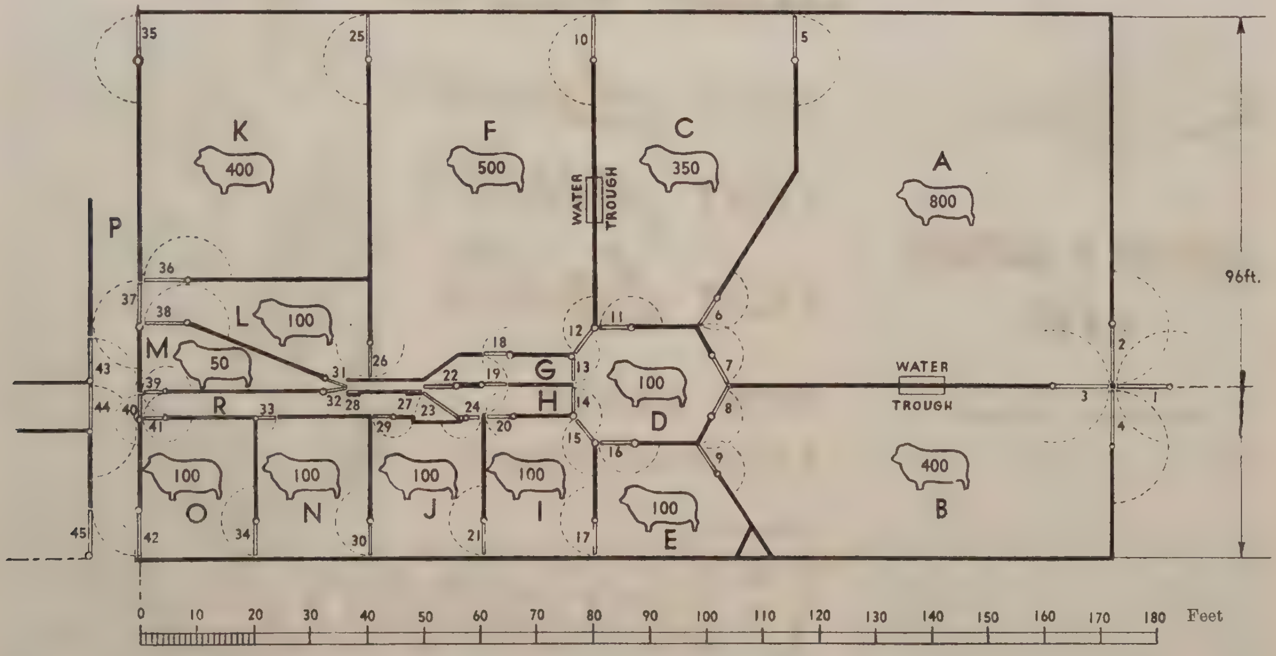
Sundries

As for No. 1 Plan.

* If drafting gates are constructed on the laminated principle (3 layers) to give a flush, smooth finish, a total of 120ft. of 6in. x 7/16in. finish dressed timber will be required instead of the 42ft. of 6in. x 1in. and 24ft. of 4in. x 1in.

No. 5 Plan

No. 5 Plan (large yards to handle 1500 to 2000 sheep) is suitable for large flocks, but there are features incorporated in it which could be included with advantage in smaller designs.



No. 5 Plan: To handle 1500 to 2000 sheep

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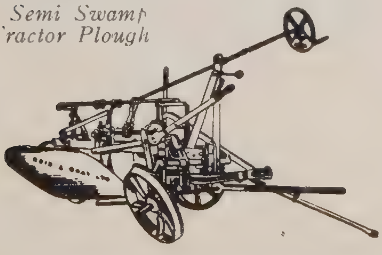
in Ploughing

The art of ploughing has seen many changes . . . In the motive power—from oxen, through the draught horse, to to-day's rugged tractor. In the plough itself, from a crudely-fashioned wooden device, to the precision ploughs of to-day as made by Reid & Gray. "R. & G." ploughs are expressly designed for differing types of work—the famous "Silver Pattern" Tractor Plough for ordinary conditions; the Semi-Swamp Plough for heavier work. And Reid & Gray development continues—hence the recently released Mounted Ploughs for Fordson Major Tractors. Consult your local "R. & G." man whenever you have ploughing problems.

Semi Swamp Tractor Plough



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F.3.

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The principal noteworthy features are as follows:—

The diamond pen (D) forms a useful collecting point and also a short cut between seven different pens. It therefore adds considerably to the handiness of the yards. It is designed to hold 100 sheep and the surrounding pens hold multiples of this number, which is a useful feature in filling the "diamond."

The double crush pen shown is fitted with four extra gates (the centre gates 18, 19, and 20 and the small gate 24). When a set of yards is built only those which are likely to prove most useful need be included. Gates 13 and 14 at the entrance to the crush pens could with advantage be built in the form of balanced lift gates.

The run-through (R) is another most useful feature and can be used for a variety of other jobs such as foot-rotting (part of it being used as a bath; see page 229 for details of how it can be filled or emptied quickly), branding, dagging, or drenching. Where a drenching "gun" is used a very convenient arrangement is to strain a wire along from end to end of the run-through, directly above it and about 8ft. from the ground. The tank for the drenching solution can then be suspended from this wire on a pulley and will follow the man working the gun along and save him carrying the tank.

The yards shown are designed to link up with a woolshed and dipping installation, the connection being indicated on the left of the plan.

Estimates of Quantities and Costs: No. 5 Plan

Fences

	ft.
Length of outer fence	488
Length of fence round diamond	36
Length of other internal fences ..	484
Length of all fences (excluding gates	1,008

If five 4in. x 1¼in. rails are used for fences a total of 1008 x 5 = **5040 lineal feet** of this timber will be required.

Crush and Race

End panels of the crush on both sides are close boarded with single-dressed 6in. x 1in.'s = **16ft. x 6 = 96 lineal feet.**

Sides of race are close boarded with single-dressed 6in. x 1in.'s = 28ft. x 6 = **168 lineal feet.**

* If drafting gates and race stop-gates are constructed of double-dressed 6in. x 1in. timber, add **66 lineal feet,** plus **56 lineal feet of 4in. x 1in.** (dressed) for stiles, and stiles and stays of hinged end panel of crush.

Gates

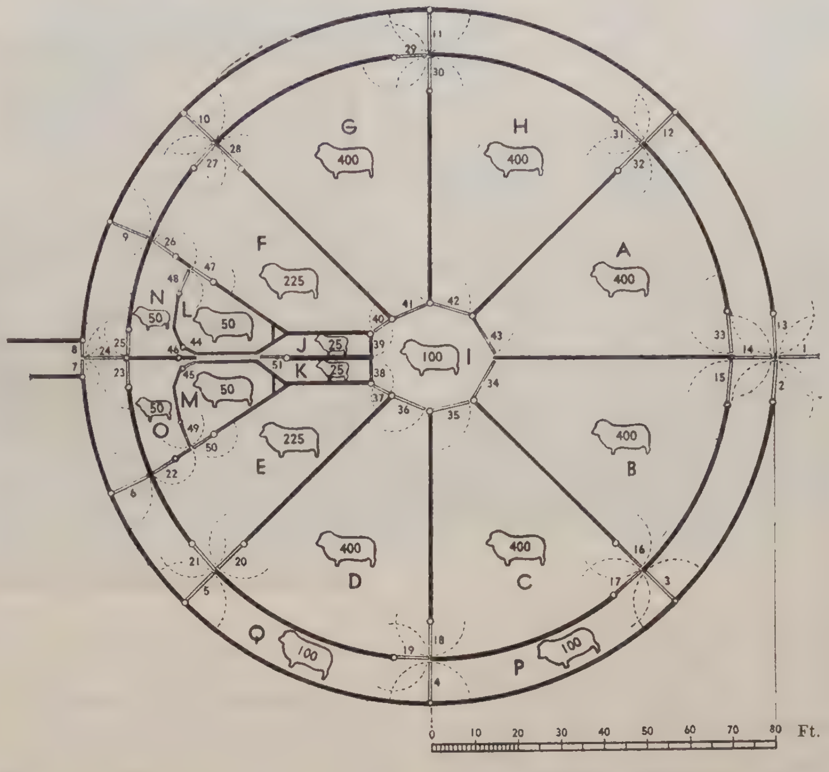
If common swing gates are constructed, the following timber will be required:—

For 4 x 10ft., 11 x 8ft., 14 x 6ft., 5 x 5ft., 5 x 4ft., and 1 x 2ft. gates a total of **2122 lineal feet of 4in. x 1in.** timber for stiles and stays of all gates, and rails of gates under 7ft., plus **640 lineal feet of 4in. x 1¼in.** timber for rails of gates 7ft. or wider.

Total timber (lineal feet): 5680 of 4in. x 1¼in., 2178 of 4in. x 1in., 330 of 6in. x 1in.

PLANS OF SHEEP-DRAFTING YARDS

No. 6 Plan: To handle 2000 sheep or more



Posts

A total of 183 posts will be required and of these at least 43 require to be heavy enough to act as gateposts.

Cost

The same general remarks apply as for No. 1 Plan.

Timber

super ft.	in.	in.	At per 100 super ft.		£	s.	d.
2367	4 x	1¼	£2 10	..	59	3	6
726	4 x	1	£2 10	..	18	3	0
165	6 x	1	£2 10	..	4	2	6
183 posts at £38 per 100				..	69	10	10
Approx. 813 ⅜in. x 3½in. to 4½in. black bolts and nuts at average of 15s. per 100				..	6	2	0
Approx. 813 ⅜in. washers at 2s. 9d. per gross ..				..		15	6
43 pairs of hinges and gudgeons at average of 7s. 6d. per pair ..				..	16	2	6
Estimated cost ..				..	£173	19	10

Sundries

As for No. 1 Plan.

* If drafting gates are constructed on the laminated principle (3 layers) to give a flush, smooth finish, a total of 120ft. of 6in. x 7/16in. finish dressed timber will be required instead of the 42ft. of 6in. x 1in. and 24ft. of 4in. x 1in.

No. 6 Plan

Circular sheepyards have had phases of popularity for many years, and as they certainly have some advantages not possessed by other types, an example (No. 6 Plan: Large circular yards to handle 2000 sheep or more) is included here. There are apparently many who assume that circular yards can be built of practically any size, but a little reflection will show that this is not the case with the usual type shown here. There must be room for the crush, the race, and the drafting pens, not to mention part of the diamond, between the centre and the outside fence of the yards. This imposes a certain minimum size which is not much below that shown in No. 6 plan.

Though the plan is largely self explanatory, one or two features can be elaborated on. The central diamond pen (I) can be used to great advantage in circular yards and is really an essential part of the design. In this case it communicates with not fewer than 10 different pens. The outside race or alleyway also serves as a connecting link between the majority of the pens. In the plan only two entrances to the yards from outside paddocks are shown, through gates 2 and 13, but of course fences and gates can be included at any convenient point round the outside ring fence to suit existing conditions.

Four-way drafting is a feature of the design and circular yards lend themselves to this. The arrangement of gates leading to the woolshed should also be noted. The end of the ramp is closed by two small gates (7 and 8) each 4ft. long. They may be swung across to meet gates 23 and 25 of the drafting pens so that sheep from pen

N or O can be run through directly into the shed; also by swinging gate 24 to meet gate 7 or 8, sheep may be run into the shed from either half of the outer ring of the yards.

Estimates of Quantities and Costs: No. 6 Plan

Fences

	ft.
Length of outer ring fence ..	475
Length of inner ring fence ..	360
Length of other internal fences	546
Length of all fences (excluding gates)	1,381

If five 4in. x 1¼in. rails are used for fences, a total of 1381 x 5 = **6905 lineal feet** of this timber will be required.

Crush and Race

End panels of the crush on both sides are close boarded with single-dressed 6in. x 1in.'s = 16ft. x 6 = **96 lineal feet.**

Sides of race are close boarded with single-dressed 6in. x 1in.'s = 28ft. x 6 = **168 lineal feet.**

* If drafting gates and race stop-gates are constructed of double-dressed 6in. x 1in. timber, add **84 lineal feet,** plus **48 lineal feet of 4in. x 1in.** (dressed) for stiles.

Gates

If common swing gates are constructed, the following timber will be required:—

For 19 x 10ft., 2 x 9ft., 12 x 8ft., 9 x 6ft., 4 x 5ft., and 2 x 4ft. gates a total of **2379 lineal feet of 4in. x 1in.** timber for stiles and stays of all gates, and rails of gates under 7ft., plus **1520 lineal feet of 4in. x 1¼in.** timber for rails of gates 7ft. or wider.

Posts

A total of 226 posts will be required and of these at least 53 require to be heavy enough to act as gateposts.

Costs

The same general remarks apply as for No. 1 Plan.

Timber

super ft.	in.	in.	At per 100 super ft.	£	s.	d.
3511	4 x	1¼	£2 10 ..	87	15	6
809	4 x	1	£2 10 ..	20	4	6
174	6 x	1	£2 10 ..	4	7	0
226 posts at £38 per 100 ..				85	17	7
Approx. 1050 ⅜in. x 3½in. to 4½in. black bolts and nuts at average of 15s. per 100				7	17	6
Approx. 1050 ⅜in. washers at 2s. 9d. per gross				1	0	0
51 pairs of hinges and gudgeons at average of 7s. 6d. per pair				19	2	6
Estimated cost				£226	4	7

Sundries

As for No. 1 Plan.

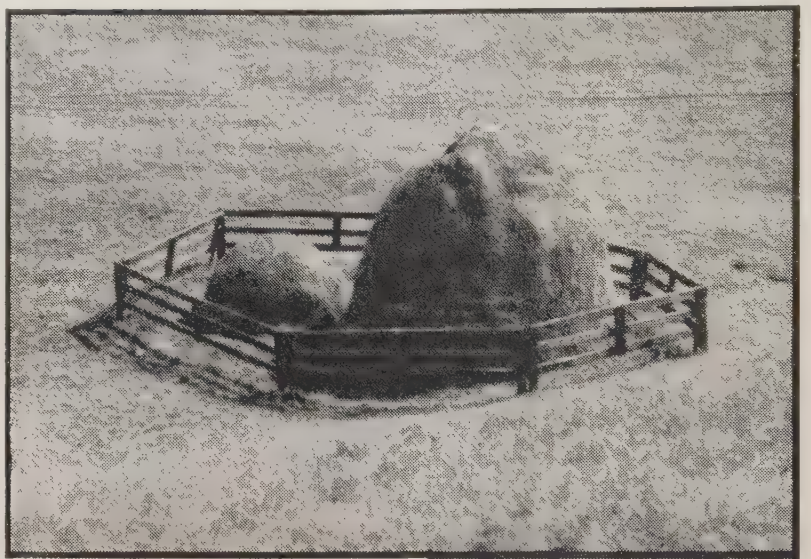
* If drafting gates are constructed on the laminated principle (3 layers) to give a flush, smooth finish, a total of 120ft. of 6in. x 7/16in. finish dressed timber will be required instead of the 42ft. of 6in. x 1in. and 24ft. of 4in. x 1in.

Acknowledgment

The assistance of farmers who allowed photographs and details of their installations to be used for this article is acknowledged.

◆

Quick and Effective Method of Fencing off Haystacks



By A. V. ALLO, Instructor in Agriculture, Department of Agriculture, Tauranga.

IN most cases farmers fence stacks to protect them from stock, and the erection or dismantling of fences takes time. A very simple and effective method of fencing stacks is used by Mr. R. Benner, of Pongakawa, in the Te Puke district.

Mr. Benner has found that by using home-made hurdles for the purpose considerable time and energy can be saved. The hurdles are 11ft. to 16ft. long and were made of 6in. x 1in. tawa which was dipped in a mixture of equal portions of tar and creosote. They are 3ft. 6in. high and have 3 lengthwise boards spaced 6in. apart, the bottom board being 12in. off the ground. Each corner is bolted to two end boards, one of which is 3ft. 6in. high and the other 2ft. 6in.

To erect the fence steel standards, to which the hurdles are fastened with wire, are driven into the ground at each end of the hurdles. With an oblong stack a standard is placed between each pair of hurdles, but with a round stack 3 standards suffice. Posts can be used instead of standards if desired. It took 15 minutes to erect the fence shown in the illustrations and dismantling can be done even more quickly.

It has been shown that this system of fencing off stacks is absolutely cow-proof, and the fence can be opened up anywhere when the stack is being fed out. This enables advantage to be taken of the wind.

The hurdles can be put to many other uses; they make easily erected docking pens with wire netting lightly stapled on the inside. The practical farmer can easily visualise many advantages in having these hurdles available at any time. They can be made in winter on wet days and they are an asset on any farm.

Systems of Pig Feeding and Management in New Zealand

Cheese and Casein Supply Farms (Whey Feeding)

IN this, the second of a series of articles dealing with the various systems of feeding and management employed in pig raising in New Zealand, I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington, deals with methods used on farms supplying milk to cheese and casein factories.

[National Publicity Studios photo.

Whey for pigs is carted to the farm after milk has been delivered to the factory.

A VERY considerable section of the dairy industry in New Zealand is devoted to the manufacture of cheese and casein, a total of about 100,000 tons of cheese and 5000 tons of casein being produced annually. The dairy by-product from this manufacture is whey, and this forms the basic food for the production of a large amount of pig meat. Pig production from this source in New Zealand is unique in the same way that pig production from skimmed milk is, in that whey forms the great bulk of the ration on which the pigs are fed, small quantities only of meal and home-grown crops being fed with it.

A difference in the routine of the cheese or casein supply farm compared with a home-separation dairy farm is that the farmer on the former delivers the whole milk to the dairy factory once a day and brings back the whey on which he feeds his pigs; this supply has to last the pigs 24 hours. The whey is carried either in the empty milk cans or in a special tank; it is emptied into a tank or drums as soon as it arrives on the farm.

The dairy farmer who supplies milk to a cheese or casein factory is faced with the same problem in fitting in his pigs to the feed supply as is the home-separation dairy farmer. In fact the difficulty is even greater, as there is a tendency for the cheese and casein factory supplier to regulate the calving dates of his cows more closely than the home-separation farmer. Cheese factories cease manufacture for at least 2 months during winter and the farmer endeavours to have all his cows dry during this period and to bring them in as rapidly as possible after the factory reopens, which is generally at the beginning of August. The factory arranges to receive milk from cows that have to be milked during the winter and this is separated at the factory, the cream being made into butter and the skimmed milk taken home by the farmer for his pigs.

In the same manner as the home-separation dairy farmer, the cheese supplier either breeds his own pigs or buys weaners and stores and fattens them; and results are similar as far as the profit made out of the pigs is concerned. The cheese supplier has one slight advantage over the butter supplier today in that, as a rule, he does not have to take home more whey than he requires for the pigs on hand, except in places where the factory manager is having difficulty in disposing of surplus whey and insists on suppliers taking it.

Today there are a number of suppliers to cheese and casein factories who do not keep pigs themselves but who in many cases sell their whey to another supplier who does; in former years it was often necessary for factory managers to station a man at the whey tanks to see that no supplier took more than his share of whey.

This calls attention to a point in the organisation of cheese-manufacturing dairy companies: Whey resulting from the process of cheese manufacture remains the property of the individual supplier and the dairy company has no rights over it. This has hindered the establishment of large-scale pig farms adjacent to dairy factories.

System of Feeding Whey

Whey contains approximately 6.5 per cent. of solids, compared with 8.7 per cent. of solids in skimmed milk, so that gallon for gallon it has about three-quarters of the feeding value of skimmed milk; 1½ gallons of fresh whey are the equivalent of 1 food unit. But out of every 100 gallons of milk used for cheese manufacture only 75 gallons of whey is produced, whereas 100 gallons of milk separated for cream supply to a butter factory produces approximately 90 gallons of skimmed milk. Therefore, the whey from a herd of cows is about half as valuable for pig-meat production as the skimmed milk from the same herd would be.

Five Feeds a Day

Though whey contains practically all the sugar of milk or lactose present in the milk and most of its mineral content, it is deficient in fat and protein. For that reason it is necessary to supplement whey at all stages of feeding with meat meal, which supplies both protein and fat, and also, for complete success, with good pasture, access to which must of course be controlled.

This means that rather a different system of feeding is used from that employed for skimmed milk. The whey is carted back from the factory and placed in drums spaced at convenient intervals round the piggery or in a central tank from which it is conveyed to the troughs by pipes and tap. The fresh whey arrives on the farm after milking in the morning and the supply has to last until the next day. Owing to the lower food value of whey, larger quantities of it are fed than of skimmed milk, and, in order that the pigs may assimilate the greater bulk as well as possible, feeding is more frequent. Five feeds per day are usual: Before milking in the morning, after milking (when the fresh whey arrives from the factory), at midday, and again before and after milking in the evening. Because whey becomes acid very rapidly, a handful of agricultural lime is generally placed in the whey containers every day to counteract this and the first feed of the day, before milking in the morning, contains the smallest quantity of whey; at this feed up to half the daily ration of meal is given. Some farmers omit the early-morning feed and finish all the whey at the last feed at night to avoid any chance of the pigs getting stale or acid whey. Whey tanks and drums are cleaned out daily, as one of the most frequent causes of trouble is allowing stale and acid whey to accumulate in the containers.

Basic Ration

The basic ration per pig per day of whey and meal is fed in the following quantities, meal being given in each case immediately after the quantity of whey:—

Sows: Before farrowing, 6 to 10 gallons of whey and 2 to 3lb. of meal;

PIG FEEDING AND MANAGEMENT

["*New Zealand Farmer*" photo.

Whey is emptied into containers when the farmer returns from the factory. The whey tank shown is on a trolley which runs along a light tram track. A tap controls gravity feed to the troughs.

after farrowing, 10 to 15 gallons of whey and 3 to 4lb. of meal.

Suckers: 1 pint of whey at the commencement of feeding in the creep up to 2½ gallons at weaning time and 2oz. of meat meal up to ½lb. during the same time: From weaning to 3 months old, 2½ to 5 gallons of whey and ½lb. to 1lb. of meal.

Porkers and baconers: 5 to 8 gallons of whey and 1lb. of meal.

Today meat meal alone is generally used. Before 1940 barley meal was used as well, generally in the proportion of one of meat meal to two of barley meal, but its high cost at present is restricting its use.

It must be emphasised that in this article, as in the article in last month's "Journal" on the home-separation dairy farm, the quantities of food stated are the average quantities given and the methods of management those used by the efficient pig producer. Observation of the feeding habits of each pig is of the utmost importance in achieving success.

Methods of Management

The farmer who supplies a cheese or casein factory adjusts the farrowing dates of his sows to the calving dates of his herd in the same manner as the farmer on the home-separation farm. He tends to farrow his sows a little earlier than the latter, generally in May and November; some farmers even farrow their sows from mid-April and again, of course, from mid-October. By doing this they have the maximum number of pigs on hand when the supply of whey is at its peak (November and December). May litters are put off as baconers without difficulty, and in autumn, when the supply of whey is declining, the same policy of disposing of pigs as porkers is followed as on the skimmed-milk farm. The last of the summer litters reach light bacon weight at the end of the season.

Root crops are frequently grown for winter feeding and to supplement the falling supply of whey toward the end of the season. Good pasture is of great importance in producing pigs on whey and the layout of the piggery is such that controlled access to pasture paddocks can be given with the maximum ease. Because the value of the whey from a herd of cows is approximately half the value of the skimmed milk from the same herd, the sow-cow ratio, though varying with the type of production, is only half what it is on the skimmed-milk farm. In practice today, however, a large proportion of the cheese and casein suppliers who produce pigs use considerably more whey than that produced by their own herd; this extra whey is bought on a per-cow basis from suppliers who do not keep pigs. The production of pigs on whey from casein factories does not differ in any way from that from cheese factories.

Lactose By-product

A considerable quantity of whey is used in the production of lactose or sugar of milk, two plants for this purpose being in operation. There is a by-product from lactose extraction—"mother liquor of whey"—which can be used as a food for pigs. Its value is two-thirds that of the fresh whey from which it is the residue and it requires supplementing with molasses and meal, preferably a grain meal. Owing to extraction of sugar, it is relatively much richer in protein than fresh whey. It is a thick, oily liquid and has the advantage that it will keep for a considerable time under proper conditions. For that reason it forms a valuable addition to pig rations in winter when no other dairy by-products are available. The method of feeding the by-product is to break it down with water at the rate of 6 parts of water to 1 of mother liquor and to feed it in the same manner as skimmed milk.

Unfortunately at present a large quantity of whey which could be used for pig-meat production is being wasted. This is one direction in which a big increase in production could be attained. As pig raising on whey is not difficult and is very profitable, all suppliers of cheese and casein factories should produce pigs.

DAIRY PRODUCE GRADED FOR EXPORT

THE following figures showing quantities of dairy produce graded for export during July and for the 12 months ended July 31, 1950, with comparative figures for the same month and 12-monthly period of 1949, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER—

Period	Tons Creamery	Whey	Total	Percentage inc. or dec.	Tons Total in store at end of mth.
July, 1950	1,464	13	1,477	—	6,070
July, 1949	1,494	8	1,502	—	7,220
Increase or decrease	—30	+5	—25	—1.664	—1,150
For 12 months ended 31/7/50	142,639	2,913	145,552	—	—
For 12 months ended 31/7/49	143,676	2,641	146,317	—	—
Increase or decrease	—1,037	+272	—765	—0.522	—

CHEESE—

Period	Tons White	Coloured	Total	Percentage inc. or dec.	Tons Total in store at end of mth.
July, 1950	213	12	225	—	7,644
July, 1949	201	7	208	—	5,457
Increase or decrease	+12	+5	+17	+8.173	+2,187
For 12 months ended 31/7/50	78,869	21,584	100,453	—	—
For 12 months ended 31/7/49	89,639	5,170	94,809	—	—
Increase or decrease	—10,770	+16,414	+5,644	+5.953	—

If these figures are converted into butterfat equivalent, there is an increase of 0.860 per cent. in butterfat graded for the 12 months as compared with the corresponding period of the preceding season. It should be noted that the above figures refer only to butter and cheese graded for export, and that owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Use of Meals with Whey as Pig Food is Still Profitable

By E. D. EDWARDS, Assistant Technical Officer,
Department of Agriculture, Wellington.

AS the costs of supplementary meals have increased in recent years, some pig producers may consider that it is not profitable to use whey because of the increased costs of the necessary concentrates. However, a recosting of the results of trials in 1942 with various meals as supplements to whey reveals that the farm return for whey today is in the same proportion to costs as it was in 1942, when pig meat was 6d. per pound and the cost of meals averaged about 12s. 6d. per hundredweight.

THE following survey of the results of trials carried out by the district pig council in 1942 on six farms in the Auckland district indicates that on today's figures meat meal alone is the most economical supplement to use with whey. Because of relative scarcity of meat meal, however, other concentrated feeds may have to be used, and these, if fed with care and discretion, can yield a satisfactory return.

Cash Return from Whey

The comparative values of whey when supplemented by various meals under present price relationships have been determined by the reassessment of data obtained during the trials. This adjustment of meal values is shown in Table 1.

Because of its bulky nature and low protein content whey must be supplemented with meals and particularly those containing growth-producing constituents. High-priced meals must therefore be used carefully to obtain maximum profits and to ultilise fully the feeding value of whey.

Though only four pigs on one farm were used for a restricted period and drought conditions on another farm reduced the time under trial to 50 days, the results of the trials were sufficiently reliable to serve as the basis for determining the probable return from whey under existing price levels.

The value of pig meat in 1942 was taken as 6d. per pound and for 1950 it is taken as 11d. per pound.

Table 2 indicates the return per gallon of whey when used with the supplementary meals shown in Table 1.

TABLE 1—MEAL PRICES, 1942 AND 1950

Meal	1942	1950
Meat meal A (50 per cent. protein)	9s. 6d. per 112lb.	12s. per 112lb.
Meat meal B (60 per cent. protein)	14s. per 112lb.	18s. per 112lb.
Proprietary meal	15s. per 100lb.	20s. per 100lb.
Maize	12s. per 100lb.	For the carbohydrate meals barley meal has been substituted on an equivalent food unit basis and having a value of 22s. per 100lb.
Copra meal	9s. 6d. per 100lb.	

TABLE 2—SUMMARY OF RESULTS OF SIX FEEDING TRIALS

Farm	Meal used as supplement to whey	No. of days on trial	Increase per pig per day lb. carcass weight	Carcass weight per pig at beginning and end of trial		Cost of meal per pig 1950	Return per gallon of whey (pence)	
				Beginning (est.)	End		1942	1950
1	Meat meal A Barley meal	122	.73	27	117	19/6	.85	1.61
	Meat meal B Barley meal	131	.66	27	114	23/10	.64	1.29
2	Meat meal B	116	.69	28	108	16/11	.85	1.62
	Barley meal	116	.73	28	113	20/2	.88	1.09
3	Meat meal B	71	.84	55	114	11/3	.98	2.02
	Barley meal	67	.75	48	98	12/3	.80	1.51
4	Proprietary meal	50	.57	30	59	6/3	.56	1.12
	Barley meal and minerals	50	.56	27	55	7/1	.55	1.09
5	Meat meal A Barley meal	93	.60	38	94	10/9	.63	1.21
	Meat meal A	93	.64	36	96	7/6	.71	1.41
6	Barley meal	77	.48	30	66	19/–	.82	.94
	Meat meal A	77	.43	30	63	6/2	.75	1.55

Superiority of Meat Meal

It will be evident from Table 2 that where meat meal is used as the only meal supplement it yields a higher return per gallon of whey than barley meal. This results from the relatively high protein content of meat meal and the difference in costs of these two supplements today, the cost of barley meal being taken at £22 per ton, that of one grade of meat meal at £12 per ton, and that of the other grade of meat meal at £18 per ton. The margin between two meals is about ½d. per gallon of whey in favour of meat meal. There was no trial carried out in any one farm whereby the two grades of meat meal could be compared with barley meal.

Exceptionally high values for whey were obtained on Farm 3. These may be explained in part by the fact that this trial was carried out with pigs starting at 70lb. liveweight; other trials started when the pigs were between 40 and 50lb. liveweight.

Comparison of Meat Meals

A comparison between the two grades of meat meal used on farms in the trials indicates little difference, but the results obtained on Farms 2 and 3 showed that management can be rewarded with a high return from the higher-priced meal.

On Farm 1 the two meals were compared, barley meal providing half the meal ration in each trial; the cheaper meat meal gave a higher return by about 1-3 penny. A similar margin was obtained in Farm 5, where meat meal was compared with the combined meals.

In an average over all lots where meat meal alone was fed the meal of higher protein content gave better returns.

Proprietary Meal

The return per gallon of whey when proprietary meal, of which there was only one trial, was used was not significantly different from that obtained from a home-made mixture.

Summary

The pigs in the trials were fed up to 1lb. of meal per day. If meat meal is costed at 1½d. per pound, the expenditure on meal per pig in reaching porker weights is about 7s. 6d., which means a return of 1 2-3 penny per gallon of whey. If the feed consumed by the dry sow and litter to weaning is included, the return per gallon is reduced to a little more than 1d. The use of cereal meal supplements at present prices results in a lower return per gallon for whey and is not at present justified if meat meal is available. However, where cereal meal supplements can be grown or provided more cheaply and used in conjunction with meat meal and good pasture the food value of whey can be fully exploited.

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THE HOME GARDEN IN OCTOBER:

By S. O. GILLARD, Vegetable Instructor,
Department of Agriculture, Auckland.

WORK in the home garden in October is varied, and though discretion is necessary in sowing or planting frost-tender vegetables, every effort should be made to adhere to the planting scheme originally decided on. In southern districts there is still a likelihood of damaging frosts, but in northern districts frost-tender vegetables such as pumpkins, marrows, cucumbers, squash, kumaras, pepper, egg plant, sweet corn, and tomatoes can be set out. In districts south of Auckland some protection such as cloches, hot-caps, or wooden boxes with glass coverings will need to be given.

IN northern districts main-crop potatoes should be planted, but in southern districts caution should be exercised, as frosts may occur well into November.

To secure a succession of salad vegetables plantings should continue at intervals throughout October. Successional sowings of peas, beetroot, lettuce, spinach, turnips, and carrots and plantings of lettuce, cabbage, silver beet, and cauliflower can be made. In districts where there is little likelihood of late frosts seed of half-hardy vegetables such as dwarf and runner beans, melon, pumpkin, squash, and cucumber can be sown out of doors in warm positions. Chokos, which are suitable for growing only in the North Island, should be set out without further delay, as these vegetables require a long season of growth. In the South Island an early planting of brussels sprouts can be made if good-sized plants are available. Jerusalem artichokes can still be planted and in southern districts it is not too late to plant asparagus. Late-autumn and winter greens should not be forgotten and seed of leeks, brussels sprouts, curly kale, savoy cabbage, and broccoli can be sown. Dates of sowings for these vegetables during October or November vary according to district and variety.

Growing crops should be hoed frequently and crops such as cabbage and cauliflower should have the soil drawn up to them to provide support. For root crops such as carrots, onions, parsnips, turnips, and beetroot and small leaf crops like spinach and lettuce the soil should be level, with a free tilth.

An advantage of cultivation apart from weed control and the conservation of moisture is that it assists in the retention of plant nutrients, particularly of valuable nitrates, by retarding their loss through leaching. In addition it improves aeration of the soil and increases the rapid absorption of heat and so creates for the plant a more favourable environment for its development.

No work is as beneficial to the growth of a vegetable plant as frequent light cultivation.

Earlier-sown crops of beetroot, carrots, turnips, silver beet, and parsnips should be lightly hoed as soon as they show through the ground and when they are large enough they should be thinned.

Seedlings which are not to be transplanted will require thinning; this work should be done as soon as the plants are large enough to handle and before they begin to "draw" or become spindly from crowding. When rows of seedlings are thinned the strongest plants should be allowed to remain, due consideration being given to correct spacing. If plants are not correctly thinned, an inferior crop invariably results.

Valuable time can be saved later and unnecessary consolidation of the soil avoided if supports for tomatoes and runner beans are placed in position before planting. The ground for these crops should now be worked up and prepared for planting. Earlier-sown peas should now be growing freely and will benefit from being moulded up and having supports provided to prevent their coming in contact with the soil; hedge clippings which have a number of small branches but no foliage are very suitable as supports.

Plants of cabbage, cauliflower, and lettuce nearing maturity will benefit from frequent applications of liquid

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Heading photograph by Sparrow Industrial Pictures Ltd.

Busy Month as New Season Advances

animal manure. If the soil is heavy and wet and extra moisture would be a disadvantage, a side dressing of nitrate of soda at the rate of 1oz. to 6 plants is preferable. Care must be taken not to let the fertiliser come in contact with the foliage or stems of the plants; it should be worked lightly into the soil.

Asparagus*

Most established asparagus beds will now be producing spears and will benefit from a weekly application of liquid animal manure made by suspending a quantity of animal manure in a bag in a large container of water. Sufficient animal manure should be used to give the liquid the colour of strong tea.

When harvesting asparagus consideration must be given to the age and vigour of the crowns. The object is to cut only as much as will not exhaust the plants. Even with rich soil and plenty of moisture plants weakened by heavy cutting have insufficient time to regain normal vigour before growth ceases in late autumn, with the result that a lowered yield is generally secured the following season. Usually a light cutting lasting about 2 weeks can be made the second year after establishing the bed, and in the third year cutting may continue for a month. In subsequent years cutting continues for about 8 weeks. Cutting should cease in time to allow the plants to develop strong, vigorous fern growth, which will manufacture and store sufficient food in the roots for the production of good spears the following year. In harvesting, the spears should be cut a little below the surface with a knife with a chisel-like point. A good guide is to cut half as deep as the top of the crown is below the surface; if the crown is 3in. down, the spears are cut 1½in. below the surface. The spears are usually cut when they protrude 6in. above the ground, and care should be taken to avoid damaging nearby young spears and buds by pushing the knife straight down near the spear to be harvested. If the spear is held and gently pulled with the hand, it will cut easily.

Beans

There are numerous kinds and varieties of beans. These vary greatly in flavour, season of maturity, and other characteristics, thus catering for many tastes and purposes. Beans are grown in home gardens mainly for the unripe pods, which are boiled for eating, but the seed of the haricot, broad, lima, and edible soya bean, which contains large quantities of fats and proteins, is the important portion.

French or kidney beans (*Phaseolus vulgaris*) can be divided into two groups, climbing and dwarf. Dwarf varieties crop sooner from planting than climbing sorts, but do not bear for such a long period. It is advisable to grow both kinds in the garden. All varieties except broad beans are frost tender and require warm conditions for germination and growth.

The scarlet runner (*Phaseolus multiflorus*), which undoubtedly is the hardiest of its kind, differs from other runner types in that it is a perennial. The roots of this bean thicken and in well-drained soils where winter conditions are not too severe the thick, fleshy roots will shoot again each spring, usually when frost danger is past. Established roots will produce pods about 2 weeks earlier than plants from seed sown in spring.

All bean pods are green when they are small, but some turn white or yellow as they approach the edible stage. Yellow sorts are called butter or wax-pod beans. Thick, fleshy-podded beans are also known as "snap" beans, because the pods snap cleanly when bent and are free of "strings".

Beans can be grown in a wide range of soils, but well-drained, easily worked loam of good humus content is most satisfactory. The scarlet runner bean will continue to crop for a much longer period if an adequate water supply is maintained.

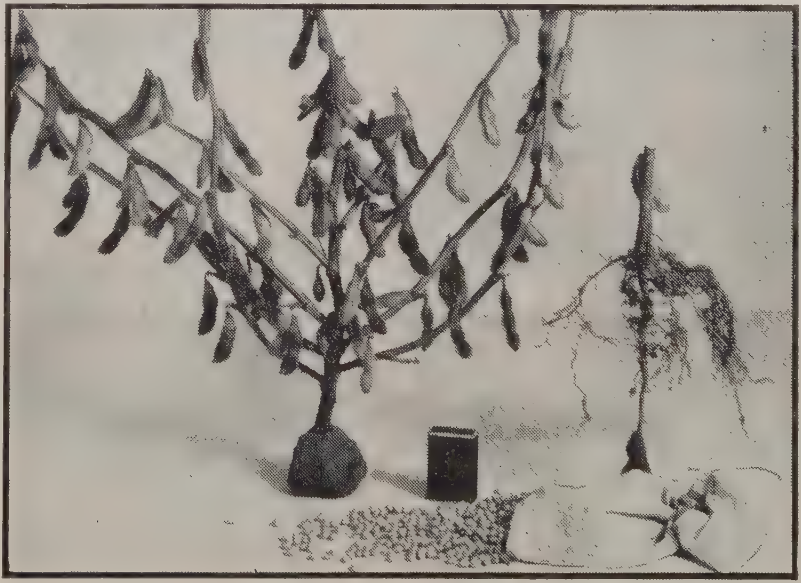
One of the main reasons for the plant failing to set its flowers is insufficient moisture during dry weather.

To maintain a regular supply of beans, sowings should be made every 3 to 4 weeks from the end of September or early October—according to district—until the end of January. These dates apply to the warmer districts and adjustments must be made in parts of New Zealand where late or early frosts occur. The ground should be well worked and limed before seed is sown. Most leguminous plants require lime and do not yield their best in sour soils. From ¼ to ½lb. of lime to the square yard is usually sufficient for most soils.

Provided the soil is moderately rich, the only fertiliser required is a light dressing of superphosphate (¼lb. per square yard) worked into the top 4in. of soil.

The seed of dwarf varieties should be sown in drills 2ft. to 2ft. 6in. apart, allowing about 4in. between the seeds. Beans should be planted from 1½ to 2in. deep, depending on the type of soil and its moisture content, the shallow depth being for heavier soils or when the moisture content is high. Climbing varieties such as Market Wonder require 4ft. between the rows and at least 6in. between the plants in the rows. If the seed is planted too thickly, there is not sufficient room for the development of the roots of the plant and poor yields result. Perennial climbing beans should be well provided with food material before planting and it is a good plan to dig a trench 12in. deep and about 1ft. wide, fill it to within 6in. of the top with compost or well-decayed animal manure, and cover it with soil.

Climbing beans require supports; these may consist of a wire-netting fence, preferably 6 to 8ft. high, or they can be supported by wooden stakes 6 to 8ft. long placed in a double row spaced 1ft. apart each way. The stakes are drawn together in pairs at the top and attached to a cross stake; two seeds are set, one on each side of each stake. Another method useful for a spare corner is to place four 7ft. stakes 2ft. apart each way to form a square and to draw



[*Sparrow Industrial Pictures Ltd. photo.*

Soya bean plant at maturity; it has partly defoliated and is almost bare except for its load of pods. The branches do not grow round the stem as with most other plants, but spread out in a flattened shape like fingers. At right is a root slightly inoculated, showing only slight nodule formation, indicating that the plant was probably grown in soil where soya beans had not been grown previously.

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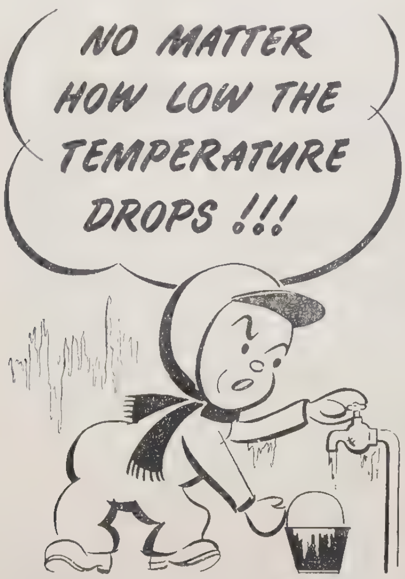
* An article by Eva Topping, Rural Sociologist, Department of Agriculture, Auckland, dealing with the preparation, cooking, and serving of asparagus appears on page 275.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the tops together wigwam fashion and tie them; three seeds are set to each stake. (See the diagram on this page.) Recommended varieties are:—

Dwarf: Early: Pale Dunn and Prince. Main crop: Tender Green, Black Valentine, also the butter or wax varieties Sure Crop, Golden Wax, and Bountiful Wax. Late: Sydney Wonder (semi-dwarf). A main crop dwarf variety Boston Bountiful makes an excellent winter haricot when dried, but it is not suitable for cooking as a green bean.

Tall or climber: Fardenlosa and Market Wonder.

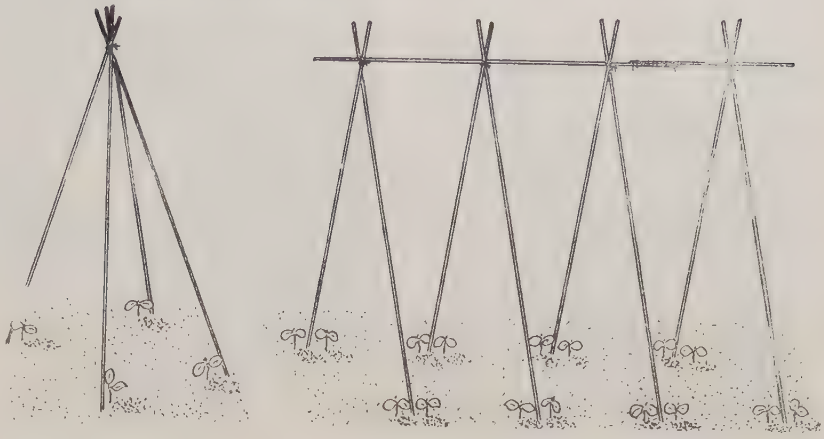
Perennial runner: Streamliner and Improved Scarlet Runner.

Lima Beans (*Phaseolus lunatus*)

The botanical differences between lima and common beans are not great, but the two types will not cross. Lima beans, which have a characteristic flavour, are shelled before cooking or are dried for winter use. They are grown like french beans, but, as they are more sensitive to cold, it is generally advisable to sow the seed a little later, even though the beans take longer to mature. There are climbing and dwarf varieties. A good tall variety is King of the Garden and satisfactory dwarf varieties are Burpees Bush, Baby Fordhook, and Baby Potato.

Edible Soya Beans (*Soya hispida*)

The soya bean has been grown in the Orient for 4000 years or more. The main nutritional value of the bean is its high protein and fat content, which is about 40 per cent. for protein and 20 per cent. for fat. The carbohydrate content is about 25 per cent. and the starch content is practically nil, which makes the bean of value to diabetics. The soya bean will grow well in nearly all types of soil, but it does best in loams containing a fair quantity of potash, lime, and phosphoric acid. Where they are grown for the first time the plants generally make poor growth unless the seed has first been inoculated. They require certain strains of bacteria not normally present in New Zealand soils, and if soya bean seed is planted in the same ground the following year, the plant growth will show a marked improvement and once the crop has been grown no further attention to inoculation is necessary, providing soya beans are grown in the same ground at least every 3 years.



Supporting climbing beans. Left—Four stakes 7ft. long set 2ft. apart each way to form a square and the tops drawn together wigwam fashion and tied. Right—Stakes placed at intervals to form a double row and tied to a pole along the top.

A method often used in inoculating the seed consists of moistening 1 bushel of seed with a solution of 3oz. of glue or sugar dissolved in a quart of water and then thoroughly mixing it with 2 quarts of finely sifted inoculated soil. Inoculated soil may be obtained from an area where soya beans have recently been grown. Inoculated seed should be sown as soon as possible after treatment and a dull day is best for planting, as strong sunlight may prove fatal to the bacteria. Usually rows planted 24 to 30in. apart give the best results on fertile soils, but for poorer soils 36in. spacings are advisable. The seed should be sown at a depth of 1½ to 2in. with a space of 4in. between seeds.

It has been estimated that there are more than 3000 distinct varieties of the soya bean. In selecting the varieties to grow consideration must be given to the maturity period, which ranges from 75 to 200 days. Early-maturing varieties are better suited to localities with short growing seasons.

[*Sparrow Industrial Pictures Ltd. photo.*

The scarlet runner bean is a perennial, and under favourable conditions develops thick fleshy roots which, if left in the ground, will shoot again the following spring. The flower (right) is scarlet.

Varieties: For New Zealand conditions the most suitable varieties in order of maturity are Mandarin (100 days), Ito San (105 days), and Manchu (110 days).

Beetroot

Beetroot is grown in nearly all home gardens. It is not difficult to grow and is tolerant to both warm and cool conditions; under favourable conditions a 30ft. row will yield 50 to 60lb. of good-quality beets.

Beetroot can be grown in almost all types of soils and should, if possible, follow a leaf crop such as cabbage or lettuce. Where the ground has been previously heavily manured a dressing of superphosphate at the rate of ¼lb. per square yard worked into the top 3in. of soil is all that is required. As beetroot is sensitive to soil acidity, lime is usually necessary on soils not recently dressed. On such soils a dressing of carbonate of lime, 4oz. a square yard, worked in some time before sowing is often satisfactory.

Seed should be sown thinly in rows 12in. apart and the seedlings thinned to 3in. apart in the rows. When thinning, care should be taken to "single" the plants, as generally two or more grow from the same seed vessel.

Recommended varieties are Derwent Globe, Obelisk, and Early Wonder.

Cabbage and Cauliflower

Cabbage and cauliflower plants can be set out 18 to 24in. apart in the rows with a 24 to 30in. spacing between the rows. The soil should be well prepared and enriched, preferably with well-rotted animal manure, to promote rapid growth to mature the plants before the weather becomes too hot. This applies especially to cauliflowers, which are seriously affected at maturity by very hot weather, which causes malformation of the curds. Where animal manure is not available a mixture composed of 2 parts of blood and bone, 1 part of sulphate of ammonia, and 1/8 part of sulphate of potash, all by weight, should be sown at the rate of ½lb. to each 6ft. along shallow furrows in which the plants

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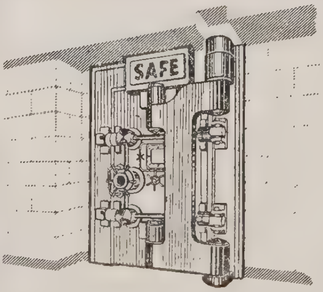

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are set out. The fertiliser should be well mixed with the soil to avoid any chance of injuring the roots of the plants. Recommended varieties for planting now are:—

Cabbage: Enfield Market, Flower of Spring, and Golden Acre.

Cauliflower: Early London and Early Snowball.

Carrots

A successional sowing of carrots as the main crop can now be made. Carrots are not difficult to grow and are one of the most important vegetables in the garden. They are very rich in vitamin A, a good source of vitamin B_1, and contain some vitamin B_2 and vitamin C. Carrots have a long period of availability and maturity periods ranging from 65 to 100 days. In localities where the carrot rust fly is troublesome it is wiser to delay sowing the main crop until November or December, as the depredations of this pest are usually less severe on later-sown crops.

Ground that has been well manured for a previous crop, preferably a leaf crop such as cabbage or lettuce, should be selected for the growing of carrots. If fertilisers must be used, they should consist of equal parts of bonedust and superphosphate plus 5 per cent. of sulphate of potash, but fresh manure must not be used, as this causes the roots to fork. If dry wood ashes are available, a dressing of ½lb. a square yard can be substituted for the sulphate of potash. Seed should be sown ¼ to ½in. deep in drills, which should be spaced 12in. apart, and when the seedlings are about 2in. high they should be thinned to about 3in. apart. Where the carrot rust fly is troublesome care should be taken to refirm the soil after thinning the seedlings. This can be done by giving the carrot rows a good watering. Recommended varieties are:—

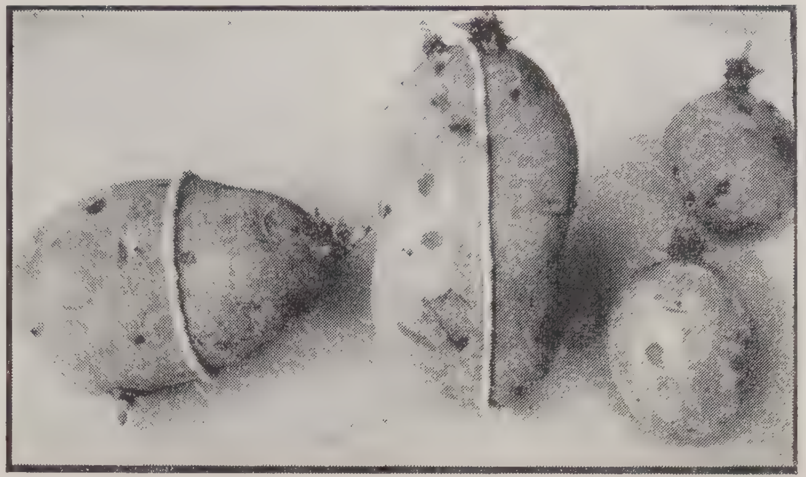
Early planting: Early Crop and Early Horn.

Main crop: Chantenay and Manchester Table.

Intermediate and Nantes are suitable for main crops in deep soils.

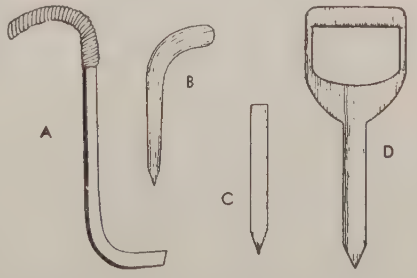
Cucumber

The cucumber (*Cucumis sativus*) is a native of Egypt and Asia. It is distinctly a plant requiring warm conditions and is easily injured by frost and cold weather. However, as plants need only a relatively short season to produce their crop, they can be grown with varying degrees of success in almost all parts of New Zealand. They are easy to grow if a warm, sunny spot is available. They yield heavily; a few plants will supply most needs and will add to the variety in the garden. As cucumbers are sensitive to cold soils, they should not be planted in the open until the ground has warmed up. For an early crop seed may be started under glass in small containers such as flower pots or strawberry chips and planted out in the garden when soil and climatic conditions are right. Seed should be sown 3 to 4 weeks before it is desired to set plants out in the garden. Temperatures for cucumbers should be slightly higher than for most other plants raised under glass. The soil should not be watered too much, but just kept moist, and before planting out plants should first be slowly subjected to outside conditions. Cucumber plants will stand replanting better when the soil is not disturbed from their roots; if this is not possible, a sheet of newspaper placed over them like a tent for 2 or 3 days after they have been set out and held in position with soil will be of benefit. It is an advantage to have the plants covered with plant protectors such as cloches or hot-caps during cool periods when the plants are still young. The cucumber requires a rich, well-worked soil and plenty of moisture during the growing season. For the home garden good results can be obtained by digging a round hole 4 to 6in. deep and 1ft. 6in. in diameter in a warm, sunny, sheltered part of the garden, filling it with fairly fresh animal manure, and replacing the soil so that a round bed 4in. high with a flat top is formed. Several seeds may be planted ½in. deep around the bed. More seeds than the number of plants required are usually sown to provide against poor germination. The plants should later be thinned to four. If artificial fertilisers are used instead of animal manure, a suitable mixture is blood and bone 4 parts and superphosphate 1 part, well mixed into the soil in the bed before planting. To encourage the development of lateral growth and assist early fruiting the tips of the vines should be pinched out when they are about 2ft. to 2ft. 6in. long.



[Sparrow Industrial Pictures Ltd. photo.

Method of cutting potato sets. Large tubers (left and centre) may be cut in two or more pieces according to the number of growing eyes. At least one strong shoot and one dormant eye should be left on each piece. Small tubers (right) are best planted whole.



Useful home-made tools for the home garden. A—A piece of hoop iron ⅛in. thick by 1in. to 1½in. wide and 12in. long makes a good weeder, especially among young seedlings such as onions and carrots. The material should be bent as illustrated, the bottom edges sharpened from the bend to the end, and the handle bound with string or cloth. B, C, D—Wooden dibbles for transplanting. The dibble on right is easily made from an old spade or fork handle.

Recommended varieties are White Spine, Moneymaker, Early Fortune, Davis Perfect, Short and Long Prickly, Crystal Apple (the fruit of which is apple shaped with a pure white skin when mature), and West Indian Gherkin. The last bears very small fruits and is used almost solely for pickling.

Kohl Rabi or Turnip-rooted Cabbage

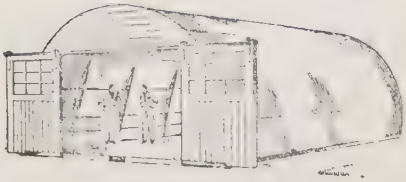
Kohl rabi resembles an above-ground turnip, the fleshy edible portion being an enlargement of the stem; when cooked it combines the flavour of both cabbage and turnip. To secure tender bulbs it should be grown quickly and used when the bulbs are 2½ to 3in. in diameter. If they are allowed to reach maturity, the bulbs become tough and stringy. Kohl rabi is hardy and can be grown equally well in hot or cool weather. October is the recommended month for planting. It grows best in a well-drained soil rich in humus. For most soils a mixture of 2 parts of blood and bone and 1 part of superphosphate applied at the rate of 4 to 8oz. a square yard will be found beneficial.

Seed should be sown ½in. deep in rows 15in. apart and later thinned to 6 to 8in. in the rows. Lack of moisture during the growing period may check growth and cause a bitter flavour to develop.

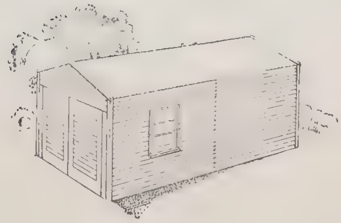
Recommended varieties are Large Green and Large Purple.

Kumaras

Kumaras (sweet potatoes) require a frost-free growing period of approximately 5 months and in the South



SIZES: 16ft. wide x 24ft., 30ft., 36ft., 42ft., 48ft., etc.



Sizes: 8ft. x 8ft., 8ft. x 16ft., 8ft. x 24ft., etc. 10ft. x 10ft., 10ft. x 20ft., 10ft. x 30ft., etc. 20ft. x 20ft., 20ft. x 30ft., 20ft. x 40ft. etc.

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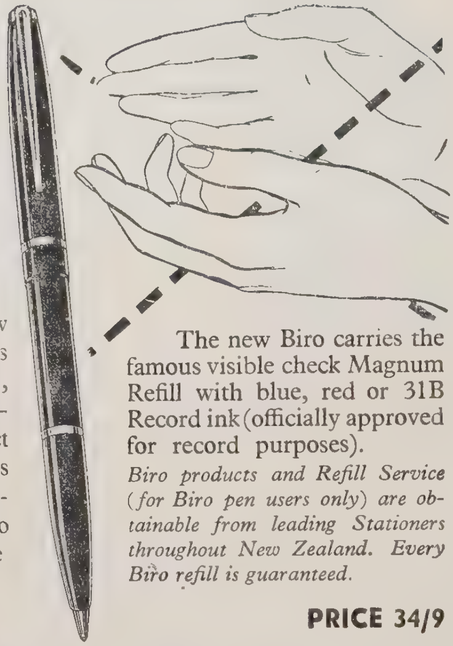

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Island, except for the warmer parts, they can rarely be grown to maturity. A method of raising plants was described in the July issue of the "Journal". It is now time to plant them, and if plants have not already been raised at home, they should be purchased from a reliable nurseryman.

Kumaras will grow in most well-drained soils, but prefer a warm sandy or volcanic soil that is not too deep and has a good firm subsoil. Animal manures or nitrogenous fertilisers are not recommended and it is preferable to use ground which was well manured for a previous crop. If a fertiliser is needed, a mixture of equal parts of bonedust and superphosphate plus 10 per cent. of sulphate of potash is recommended. This should be sown in a 12in. band along the row at the rate of 2oz. per yard and the soil drawn up over it, forming a ridge 6in. high and 15in. wide with a slightly flattened top. Side dressings are not recommended, as they encourage the roots to spread and the tubers form too far out from the row.

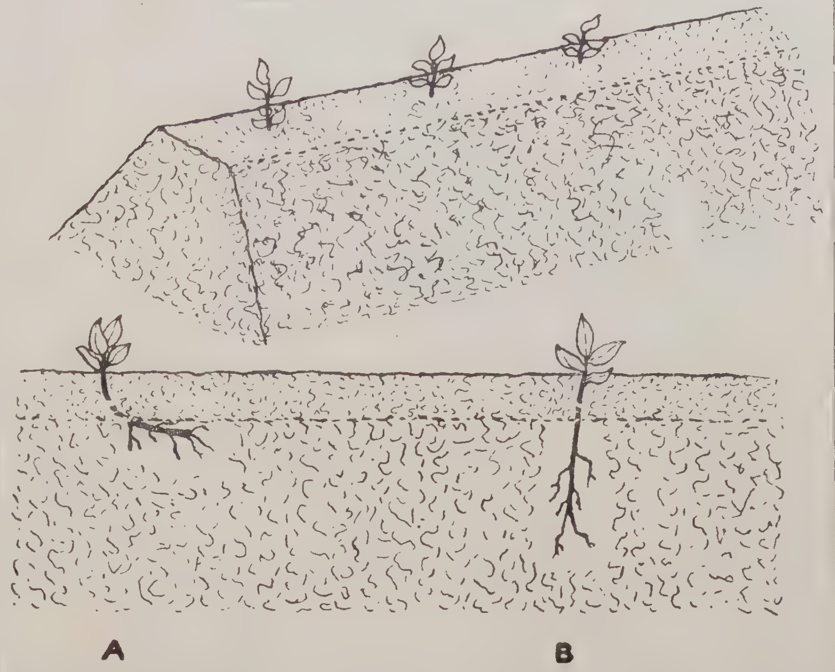
Plants should be set out 16in. apart with 2ft. 6in. between the rows. A warm day is desirable for planting and care should be taken to bend the root of each plant and to cover it to the same depth as it was in the nursery bed. The bending of the root to form a letter J with the tail under the ground is important, as it stimulates tuber development and heavier cropping than that resulting from perpendicular planting. (See the diagram on this page.)

Cultivation for kumaras should be shallow and confined to weed control and occasional raising of the vines to prevent them attaching themselves to the soil; if vines are allowed to become attached to the soil, they make heavy growth at the expense of the tubers.

Varieties: Two good varieties which are most commonly grown are Tauranga Red and the common native variety which has a pink skin.

Lettuce

Any rich soil will grow good lettuce provided sufficient lime has been applied to correct acidity. Good compost and well-rotted manure will improve the soil, but fresh manure or undecomposed materials should not be dug in just before setting out the plants.



Upper—Rooted kumara shoots set out about 18in. apart on broad low ridges slightly flattened to assist retention of moisture. Lower—A—Correct method of planting; the root is bent to retard the flow of sap from the roots to the leaves, which induces better tuber development and heavier cropping than would be the case with perpendicular planting (B).

Lettuce to be tender and crisp should be grown quickly and a nitrogenous fertiliser such as blood and bone broadcast at the rate of ½lb. per square yard before planting should give satisfactory results. Just before the plants begin to heart it will be found beneficial to apply nitrate of soda at the rate of 1oz. per 3 yards of row and this should be lightly worked into the soil. Do not allow the fertiliser to come in contact with the plants, or burning of the foliage may result.

Seed should be sown thinly ¼in. deep in rows 6in. apart or broadcast and covered lightly with soil and the plants transplanted when they are about 3in. high. For a continual supply, seed should be sown every 4 weeks.

Suitable varieties for sowing or planting in October are: Great Lakes, Neapolitan (Webbs or New York), and Imperial 847. Parish White is a suitable variety of cos-type lettuce. Mignonette, a small compact type, is very early and a sure header, and is very suitable for the home garden, especially where it is difficult to grow lettuce satisfactorily.

Parsnips

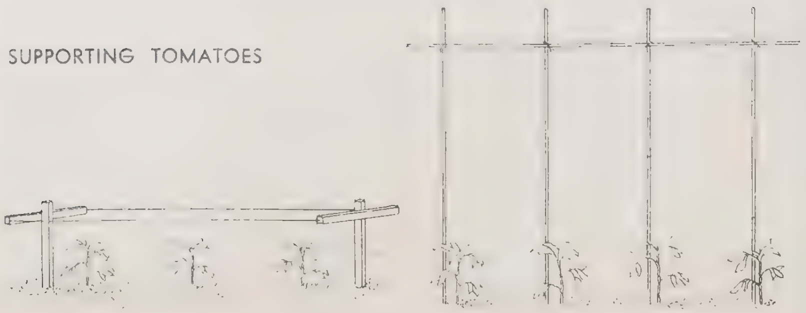
Although parsnips can be sown with good results as late as January in the North Island, they require a long season of growth and in the South Island it is advisable to sow the main crop without delay. Parsnips grow

[*Sparrow Industrial Pictures Ltd. photo.*

Lettuce varieties. Left to right—Cos, Mignonette, Neapolitan, and Great Lakes.

THE HOME GARDEN IN OCTOBER

SUPPORTING TOMATOES



To support dwarf varieties of tomatoes 12in. wooden pegs can be driven in at intervals to carry 12in. wooden arms to which the wires are attached. As the plants grow the main leaders are lifted and tied to the wire over which they are allowed to hang. Right—The simplest method of training tall tomatoes and that usually adopted by home gardeners is to stake each plant separately. Planting is on the single-row system and as growth is made plants are supported by successive ties, 6 usually being sufficient.

well in almost all soils where vegetables can be grown and best results are obtained if they are sown on land that was heavily manured for a previous crop. Superphosphate broadcast at the rate of 2 to 4oz. per square yard and, if available, dry wood ashes at the same rate will benefit the crop. Rows should be 18in. apart and depth of seeding should be $\frac{1}{2}$in. A fine tilth is desirable. Because parsnip seed rapidly loses its power of germination, it is usual to sow the seed fairly thickly. Thinning should be done when the plants are about 2in. high. If plants are first thinned to about 1in. or 2in. apart, the final thinning to 4 or 6in. apart can be left until the young roots have become a usable size for soups and stews. Half an ounce of seed is sufficient for 100ft. of row.

Hollow Crown is the best main-crop variety.

Peas

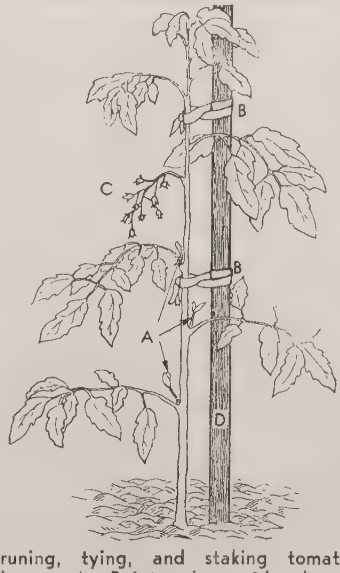
To keep up the supply of peas it is necessary, because of their short season, to make frequent sowings, and these should be continued this month. Peas do best in fairly cool weather and at this period of the year will grow well in most soils which have a fair humus content. A dressing of superphosphate or bonedust at the rate of 2 to 3oz. a square yard should be worked into the soil before sowing. The seed may be sown 1in. apart along a broad drill drawn out with a hoe to a depth of 2in. Seedlings should be earthed up as they grow to provide some support and will produce better-quality pods if given additional support with thin stakes. A pound of seed will sow about 100ft. of row.

Satisfactory varieties for sowing this month are Greenfeast, Stratagem, William Massey, and Quartermaster; the last-named variety grows to a height of 3ft.

Potatoes

Potatoes grow well in most well-drained garden soils. An artificial fertiliser mixture of 3 parts of superphosphate and 1 part of sulphate of ammonia or equal parts of superphosphate and blood and bone applied along the rows, using a weight of manure equivalent to the weight of tubers, will increase yields. Tubers may be cut or planted whole as desired. When cutting seed potatoes it is preferable to cut them into blocks with two eyes to each set rather than in wedge-shaped pieces.

Tubers should be planted 5in. deep in rows 2ft. 6in. apart, allowing about 15in. between each set.



Pruning, tying, and staking tomato plants. A—Points where side shoots from leaf axils are rubbed out before they grow more than 2 or 3in. long. These side shoots should be removed up to the seventh flower cluster only. B—Soft twine or cloth strips used to hold main stem erect. A double wrap is first made round the stake to prevent the binding from slipping and a single loose wrapping is then passed round the stem and tied. Tying should be repeated every foot or so as the plant grows. C—Fruit spur. D—Stake 1$\frac{1}{2}$in. in diameter and 6ft. long driven about 12in. into the soil and about 2in. from the stem.

Recommended varieties for October planting are Arran Chief, Aucklander Short Top, King Edward, Inverness Favourite, and, for southern districts, Dakota, a red-skinned main-crop variety.

Tomatoes

Tomatoes should be grown in every home garden, as they are always appreciated during the summer and grow under a wide range of conditions, requiring relatively little space for large production.

The tomato is frost tender and cannot be safely planted in the open until all danger from frost is past. Although they may be planted out in October in most northern districts, it will not be safe, except in a few favoured areas, to begin planting outside in southern districts until the middle of November.

If desired, plants may be raised in a small cool frame and seed should be sown 7 to 8 weeks before it is desired to set the plants out in the garden. However, most gardeners prefer to buy plants; these should be stocky and well grown and about 6in. high. Avoid spindly, drawn-up plants which have not been properly hardened off. Hardening off is done by subjecting the plants gradually to conditions similar to those they will have when planted out. If bought plants appear to be very tender, it is advisable to harden them off at home if the weather is uncertain.

As certain tomato diseases are soil borne, it is desirable to plant in a fresh position each year or at least to avoid land which has been used for this crop during the preceding 3 years.

A well-drained, warm position is desirable and the soil should be deeply dug. A good fertile soil is an advantage and stable manure, compost, or a green crop can be used to improve the soil. Stable manure and any green material should be dug into the soil sufficiently early before planting to decompose completely before the plants are set out. A fertiliser mixture of equal parts of superphosphate and blood and bone plus 5 per cent. of sulphate of potash, applied at the rate of 8oz. to 6ft. of row, should be worked into the top 4in. of soil, and if a good supply of wood ashes is available, they can be used at the same rate as fertiliser instead of the sulphate of potash.

Although it is not usual to support dwarf varieties, they will produce better-quality fruits if they are prevented from coming in contact with the soil. Dwarf tomatoes require more space than tall varieties and should be planted 3ft. apart with the rows 4ft. apart. Tall-growing varieties may be set 2ft. by 2ft. or 18in. by 3ft.

In localities where late blight, stem-borer caterpillar, and the tomato worm caterpillar are troublesome plants should be protected from the time of planting by spraying them at 10-day intervals with Bordeaux mixture and D.D.T. prepared from 4oz. of bluestone and 5$\frac{1}{4}$oz. of hydrated lime in 4 gallons of water plus $\frac{1}{2}$oz. of D.D.T. 50 per cent. wettable powder. Copper oxychloride may be used instead of Bordeaux mixture if desired. Suitable varieties are:—

Dwarf: South Australian Dwarf Red, Pearl Harbour, and Tatura Dwarf Globe.

Tall: Potentate, Best of All, Market King, Supreme, and Abundance.

Buying Perching Pullets for Household Poultry Flocks

MANY household poultry keepers prefer to buy pullets at the perching stage rather than day-old chicks, and most commercial poultry breeders cater for this trade. Though perching pullets call for a larger capital outlay, frequently they prove cheaper than chicks when the total cost of each successfully reared pullet is calculated. In this month's article for the household poultry keeper W. L. McIver, Poultry Instructor, Department of Agriculture, Hamilton, points out the advantages of buying perching pullets and gives advice about the points to be watched to ensure that good-quality stock is obtained.

[*Fraser Niederer photo.*

A 4-month-old Australorp pullet. In addition to the usual signs shown by poor-type light-breed birds, poor pullets of heavy breeds commonly grow feathers very slowly on body and neck.

EVERY job requires its special tools if the best result is to be obtained, and chick rearing is no exception. If any class of livestock suffers a setback in growth in the early stages of rearing, usually many months of subsequent good management are needed to make up the leeway, and in some cases the animal or bird never overcomes the initial setback and deteriorates into a cull. Artificially reared chicks require a suitable brooder, proper accommodation, and a carefully planned diet in their early stages.

[*Fraser Niederer photo.*

A 4-month-old White Leghorn pullet. The cut-away abdomen, long, pale face, long beak, and poor comb development denote a type which invariably produces poorly and is better killed early.

Disadvantages of Chick Rearing

Even chickens brooded under a mother hen need considerable attention and a planned feeding system, as the hen in confinement is limited in the scope of her activities and powers. She can do some things for the chicks, but she cannot go further than the householder permits. The big disadvantage of rearing chicks under a hen is that if the mother bird has lice, mites, intestinal worms, or scaly leg, or is a carrier of an infectious disease, she is almost certain to pass the complaint on to the chicks.

The average householder has neither the equipment nor the accommodation to rear chicks. Usually he has insufficient time for the work and, even if he has the inclination, a large degree of willingness will not counterbalance a makeshift brooder, an unsatisfactory brooder room, and running the growing pullets when they are off the heat with the hens because a separate run is not available.

After 6 Weeks the Best Age

If the mortality rate of the chicks is high, the survivors must carry the cost of the dead birds and can well turn out to be more expensive than birds bought as perching pullets. The most dangerous period for chick mortality is during the first 3 weeks, and the next period of danger is the following 3 weeks. After 6 weeks the likelihood of mortality is very much reduced, despite danger from a few infectious and contagious complaints.

By or before 6 weeks of age the pullets are weaned off heat, and soon afterward they learn to perch. That is the safest time at which to buy them—about 8 weeks.

Pullets younger than 6 weeks are not adequately weaned from heat in almost all districts of New Zealand and are seldom trained to perch. Even at 8 weeks of age all will not be perching, but if the seller values his business he will cull out the backward pullets for further care and attention, selling the more forward ones, which will advertise his future wares. At 4 weeks old pullets are not weaned or perching and selecting the best for sale is far more difficult, so householders are not well advised to buy pullets at this age. After 8 weeks of age birds increase in price considerably for each extra week the rearer keeps them, and when he has successfully reared them past 3 months of age he will seldom sell them without high remuneration.

If the householder is an experienced chick rearer, or if he has good luck with low mortality, rearing day-old chicks is the cheapest way of providing replacements. If not, he is better advised to buy perching pullets.

Hatching Dates for Winter Layers

To ensure obtaining quality stock that will give good winter egg production and an adequate annual total of eggs the householder must first understand something about maturity and intensity of laying. Earlier-hatched chickens mature more quickly than those hatched late in the season, but young pullets which begin to lay in late summer or early autumn cannot be expected to maintain their intensity of production through autumn and winter. Pullets hatched in late winter or early spring nearly always go into a neck moult, if not a full moult, about the following April or May and are off the lay for 6 weeks or longer.

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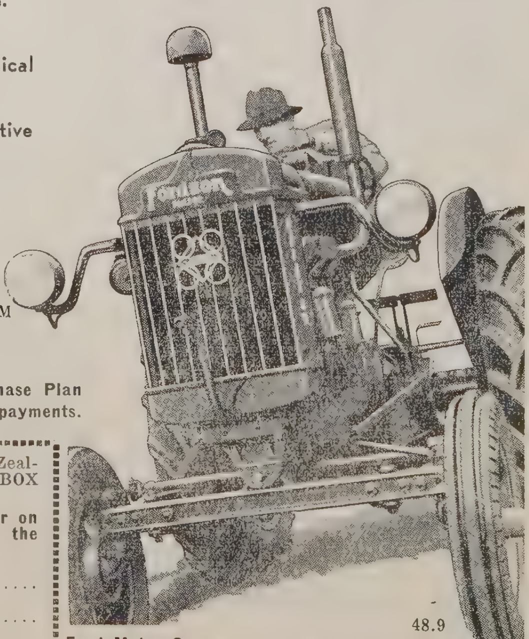

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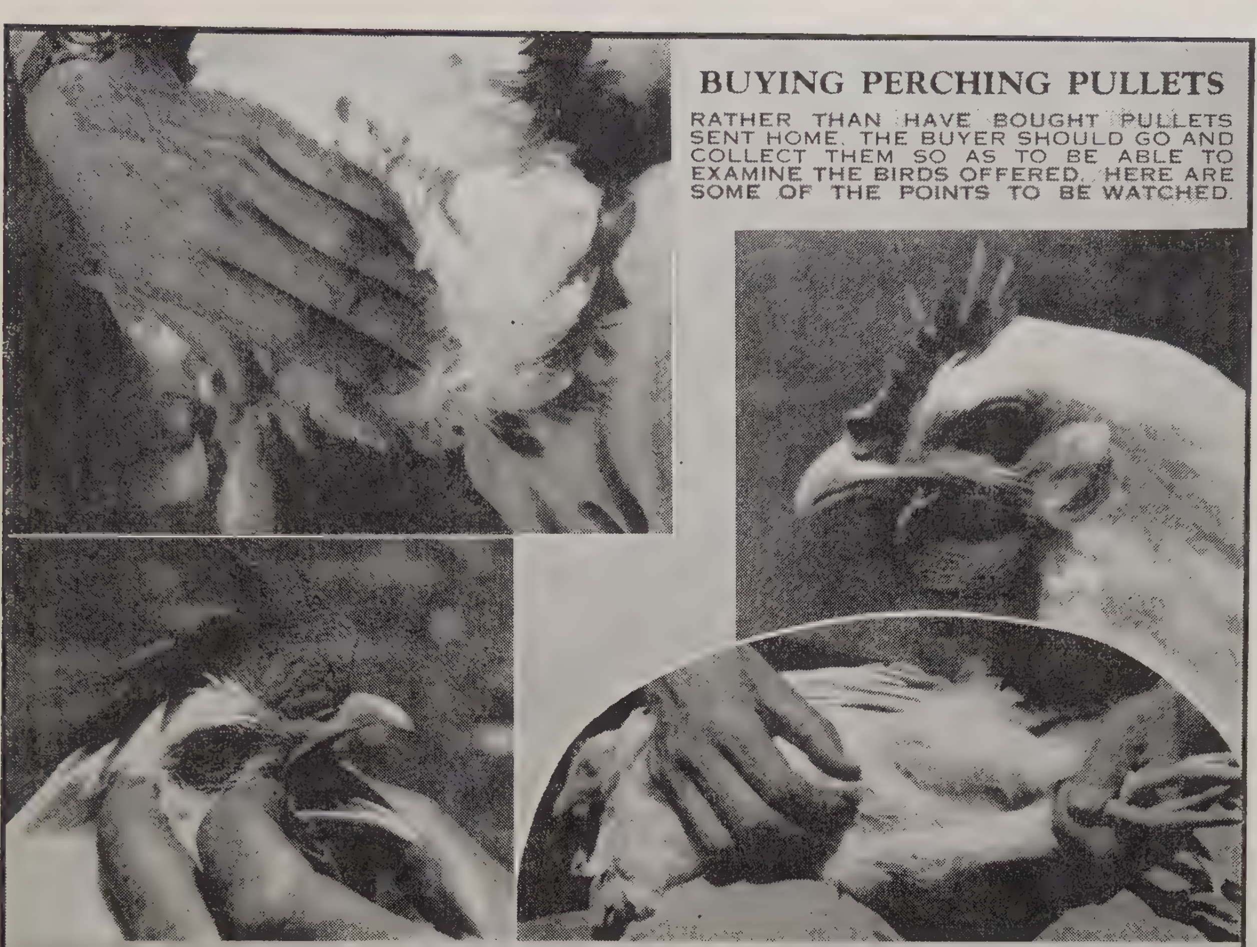
BUYING PERCHING PULLETS

RATHER THAN HAVE BOUGHT PULLETS SENT HOME, THE BUYER SHOULD GO AND COLLECT THEM SO AS TO BE ABLE TO EXAMINE THE BIRDS OFFERED. HERE ARE SOME OF THE POINTS TO BE WATCHED.



Upper left—Part the fluffy feathers on the abdomen below the vent and look for body lice or their eggs, which may be found fixed to the bases of the feathers. The vent should be moist inside and dry outside, clean, and free from discharge, and the surrounding feathers should be unstained. Upper right—The eyes should be large, bright, dry, and clean, as are those of this bird; dull, watering, and sunken eyes are signs of poor health. Lower left—Look into the mouth and down the throat; uncleanliness or sores are a warning of future trouble, such as colds or roup. Lower right—Feel the condition of the breast and keel; the breast should be full and solid, and a pullet with a breastbone that feels knife edged should be rejected; a crooked keel indicates a weakness of stamina.

[*Fraser Niederer photos.*

In general, birds of heavy breeds hatched during the latter half of August and of light breeds hatched during the latter half of September can be expected to begin laying during the follow March and to continue laying all winter. Therefore the householder should place his order with the hatchery in adequate time to obtain delivery of 8-week-old heavy-breed pullets in late October or of light-breed birds in November, even if that means placing the order a year ahead. Light breeds hatched in early October and heavy breeds hatched in early September are likely to be better winter layers than those hatched a month earlier. June and July hatches are unlikely to be good winter producers, and late-October or November hatches will not begin to lay until winter is well advanced.

Ensuring Quality of Birds

The merits of heavy and light breeds were discussed in an article in the June, 1949, issue of the "Journal".

Not only should pullets have been hatched at the desirable time, but they must be healthy and of good quality. A careful customer makes certain that the quality of any purchase is correct for the price and that it will do properly the job he wants it to do. That applies to buying pullets. If the customer is satisfied with the previous lot of pullets, he should go back to the same farmer; if he is not, inquiries should be made about a recommended source of supply.

Several of the articles in this series have dealt with the culling of poor-type birds and the selection of profitable types, and the illustrations on this page show some features to be examined when judging the worth of a bird.

Collecting pullets from the seller's farm is best, but if they are sent through any transport system, they should be examined carefully as soon as they arrive. If the buyer is dissatisfied with the birds, he should feed them, water them, and send them back promptly, and communicate with the seller, who in most cases will appreciate a proper complaint being made at once so that he can look into the cause and endeavour to rectify the position.

The purchase of quality stock should be treated as only the first step in setting up a dependable pen of layers. Housing and feeding them properly are equally important. Poor management can ruin even the best birds.

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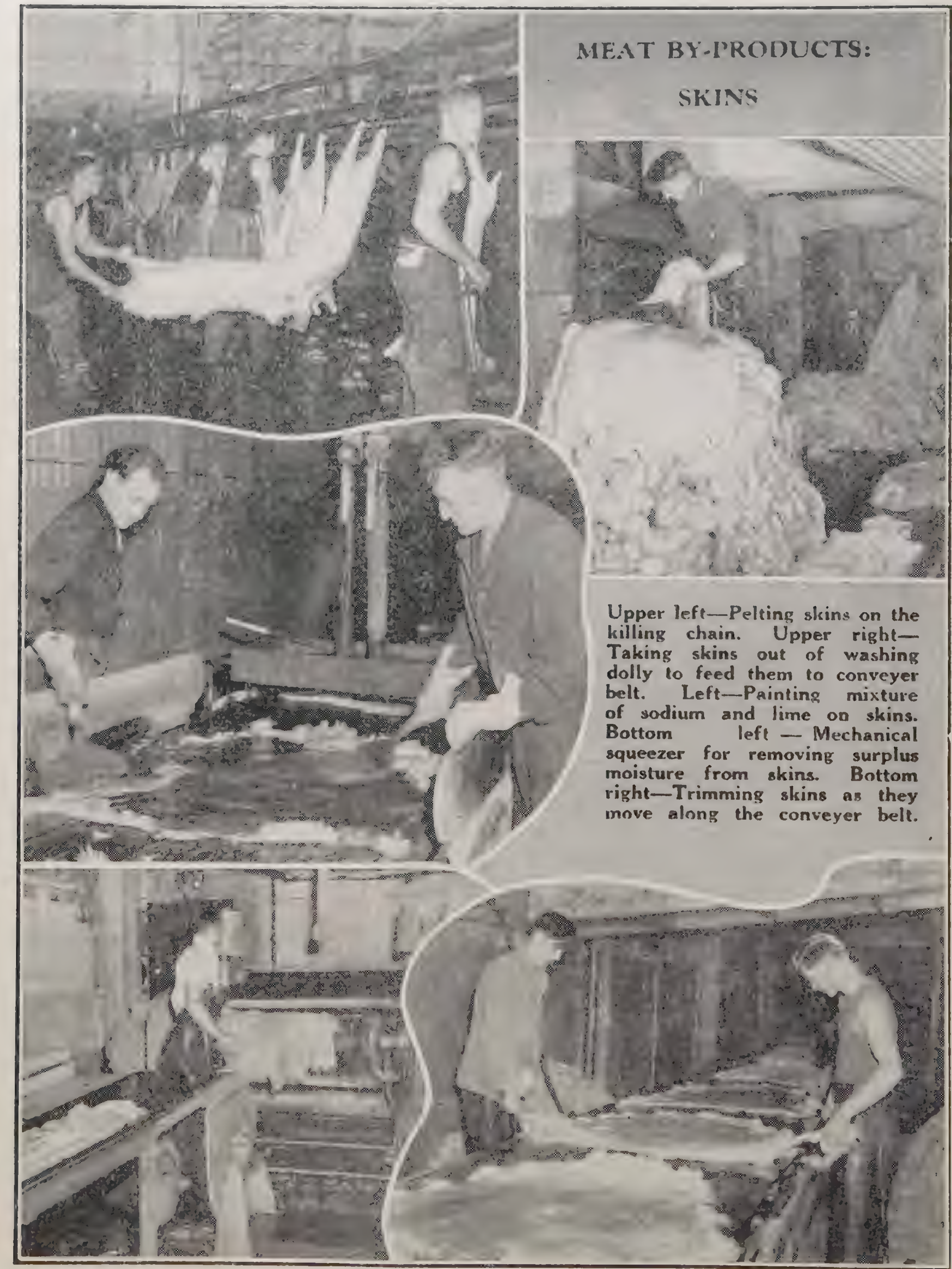
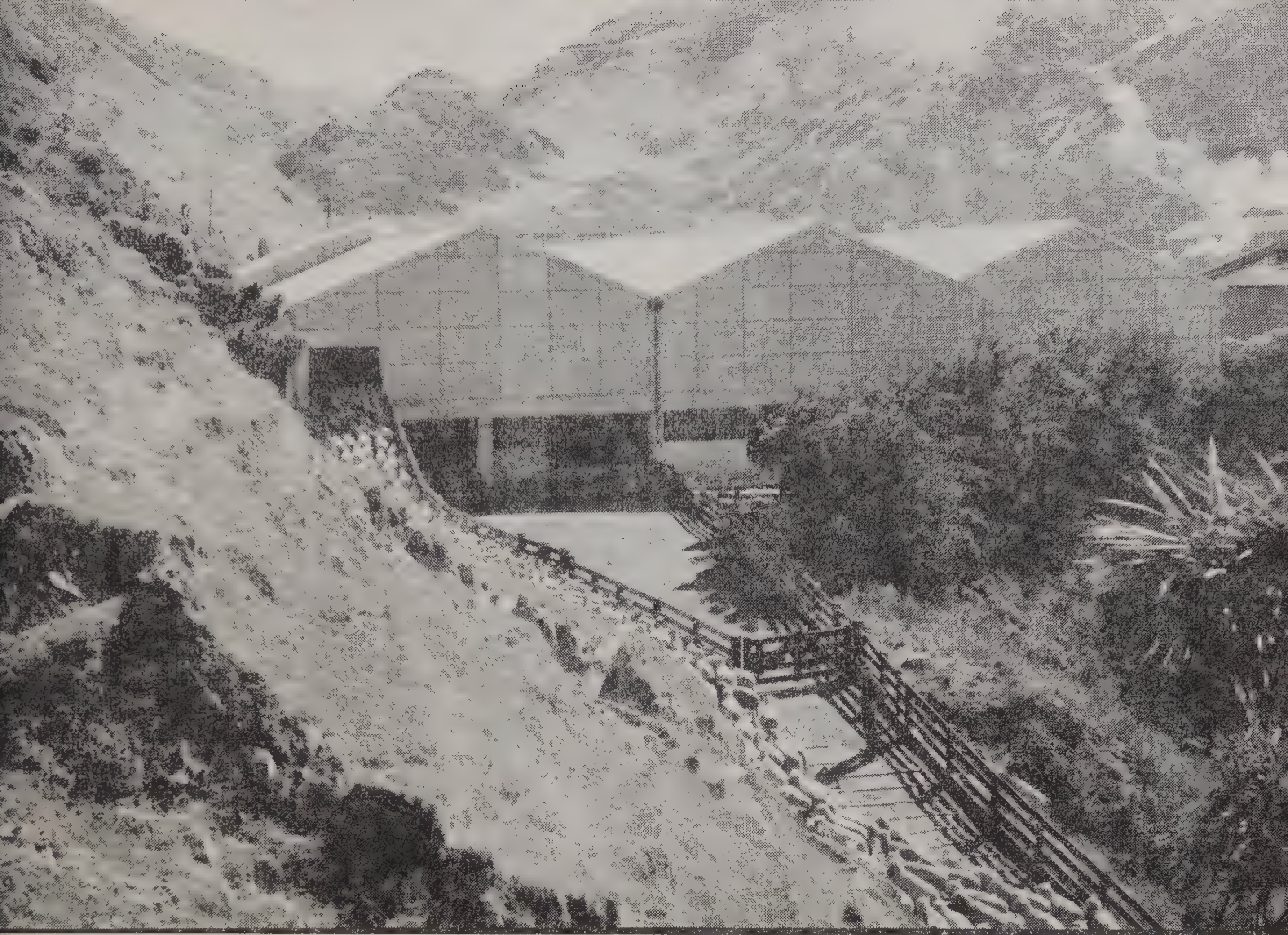


Upper left—Pelting skins on the killing chain. Upper right—Taking skins out of washing dolly to feed them to conveyer belt. Left—Painting mixture of sodium and lime on skins. Bottom left — Mechanical squeezer for removing surplus moisture from skins. Bottom right—Trimming skins as they move along the conveyer belt.



BY-PRODUCTS OF THE MEAT-FREEZING INDUSTRY

THE value of by-products of the meat industry to the industry itself and to the country as a whole is too often little realised. Wool, pelts, and tallow have become so important to the economy of New Zealand that today they are being looked upon as independent products, whereas their production relies on the ability of freezing works to handle and process all edible and inedible offals into saleable products. This is the first of two articles by I. B. Chisholm which cover generally the handling and processing of the various by-products in the average New Zealand freezing works, and in some cases touch on products processed and packed in the larger and more up-to-date works, so that the extent of the industry may be fully realised. The second article will appear in the next issue of the "Journal."

STRICTLY, by-products of meat include all portions of the animal excluding carcass meat itself. With such a definition of by-products must be included manufactured meats such as smallgoods and canned meat, and although these are not covered in this article, they provide important outlets for various types of edible meats. Some plants extend their operations to killing poultry and handling certain dairy products and would, were it possible, preserve fruit and vegetables in various forms. The facilities required for processing and distributing these products are almost the same as those in freezing works and the inclusion of these products among those handled results in better utilisation of packers' facilities and subsequently reduces the margin of costs between producer and consumer.

The smaller by-products, namely edible meats and pharmaceutical products, have been saved and packed in some New Zealand freezing works for some years, but greater attention has been paid to this aspect of the industry in recent years, with the result that today there is very little of the live animal which is not utilised to the greatest extent. There are, however, many products which it is not economically practicable to save and process in New Zealand to the same extent as is done by large overseas companies, mainly because of this country's comparatively small production and limited distributing facilities. In spite of these limitations the industry in New Zealand has vast ramifications and a great volume of labour is required to handle the by-products of about 19,500,000 sheep, lambs, cattle, calves, and pigs which are killed every year, a large percentage of them being killed during the peak few months of the season.

Every department in the works handling by-products is connected directly and indirectly with beef-, mutton-, and pig-killing floors from which run chutes and conveyers carrying all the offals as quickly as possible to their respective departments where processing begins.

HIDES AND SKINS

Historically, hides and skins were the first by-products of meat packing, and apart from the carcass itself, are still the most valuable. This emphasises the importance of proper care and handling of stock on the farm and of hides and skins in freezing works. On farms and elsewhere

Removing the hide from a prime ox.

before animals reach the works barbed wire, thorns, and parasites may damage hides and skins. In addition fire branding and some other forms of branding and the use of corrosive branding products at sales and on farms cause great damage to and depreciation of hides. Excessive use of raddle and sometimes the use of tar or other unsuitable branding material will depreciate the value of wool.

Scores and cuts made in the works have serious effects on the ultimate use of the finished leather. Leather in large pieces and free from damage procures the highest prices, but poor supervision on the killing floor may easily cost the industry many thousands of pounds.

The following important points should be borne in mind by anyone who "kills" or who has to remove a skin from a carcass:—

1. Completely rested animals are easier to flay and dress than those that are heated.
2. Damage may be caused to the grain of cattle hides by dragging carcasses over hard ground or concrete.
3. The hide or skin should be correctly opened up to leave it as square as possible.
4. Butchers should be completely trained and supervised in the flaying of hides or skins if reduction in the percentage of scores and cuts is to be achieved.

In the works all cattle hides and sheep, lamb, and calf skins are handled and processed to some extent. The skins of pigs are normally left on the carcass and only the hair is removed. Goat skins are usually sold direct to trading companies for tanning for fancy goods.

Cattle Hides

When a cattle hide is removed from the carcass it is conveyed to the hide room, where it is thrown over a low, convex table. Here the hide is fleshed or flayed by hand to remove any surplus fat and meat left on in butchering, particularly on the neck and butt end. These fleshings are sent to the tallow department and any hide trimmings are salted to be processed later into glue. Fleshing, like butchering, should be done only by experienced men.

The hide is then thoroughly washed and scrubbed to remove dirt and blood and hung flesh side up over a wooden horse to drain and to allow the hide to expel the animal heat completely.

Salting

After draining, the hide is placed on a stack and the flesh side, which is uppermost, is lightly covered with clean, medium coarse salt, particular care being taken to cover the edges and shanks well. The hide should be left in the stack at least 14 days, but the period will vary considerably according to floor space available and conditions at the plant.

After the required period the salt is swept off and the hides are graded by weight under the headings of bull, ox, cow, and heifer and freedom from fault. The graded hides are neatly folded up and placed in their respective bins to await sale by tender.

The hides when tanned are made into sole and upper leather for footwear, whips, straps, bags, athletic equipment, automobile upholstering, etc.

Calf Skins

Calf skins are handled in the same manner as cattle hides. Most of the finished leather is used in the manufacture of footwear.

Sheep Skins

Sheep skins are usually delivered to the washing dollies (wooden or concrete tubs with horizontal four-armed paddles) by water chutes from the killing floor. When the dolly is full of skins the paddle is set revolving slowly so that although the skins are washed, no damage is done to the pelt. About 10 minutes washing removes all the blood, sand, dirt, etc.

After their removal from the dollies excess water is removed from the skins in a hydro-extractor or by wringers. The hydro-extractor consists of a fairly large perforated basket which revolves at 900 to 1000 r.p.m. until the skins are partly dry. Alternatively the skins may be wrung out by passing them flat between the rubber rollers of wringers.

If the skins are too dry, wind blast may occur in the pelt; if they are too wet, the sodium sulphide in the paint which is later applied in the depilatory process is diluted and its action on the skin in loosening the wool is retarded. Thus the moisture content of the skin is very important to nearly all succeeding operations.

Painting

There are three methods for removing wool from the skin—sweating, liming, and depilatory processes. The last-named is used almost universally in New Zealand freezing works.

In the depilatory process a mixture which consists in most works of sodium sulphide and hydrated lime is painted on the skin.

The most common way to reduce the solid, concentrated sodium sulphide (Na_2S) to liquid form is to place it in a tank where it is covered with water and boiled by steam until all the sodium is dissolved. Sufficient water must be added to the concentrated Na_2S to ensure that after dissolving and cooling it will not revert to its original solid form.

After it has been cooled the sodium is run into small tanks where it is broken down to the required strengths by the addition of more water. The strength of the sodium solution may be increased by the addition of stronger Na_2S but not by evaporation of the water in it. A hydrometer is used to measure this strength at 60 degrees F.

The liquid sodium is then run into tanks equipped with slowly revolving paddles and hydrated lime is added until the sodium becomes a paste of the required density. The density may vary slightly according to the grade of lime and its ability to bind with the Na_2S to make a suitable paste. The paint is conveyed by various means into troughs at the paint table.

On sheep and lamb skins different strengths of sodium are used, and these strengths are further governed by the length of wool on the skin, which varies considerably during the season. The longer the wool, the weaker the sodium sulphide required to loosen the wool from the pelt, and vice versa.

The skins are placed on the paint table with the wool side down. The shank, head, and ear skin pieces are cut off and as they accumulate are sent to the pie wool department at intervals.

As the skins move along the paint table the sodium and lime mixture is painted on by hand, care being taken not to touch the wool on the edges. At the end of the table the skins are folded lengthwise, with paint to paint and hung up over sticks or placed flat paint to paint, in stacks on trays on the floor.

Pulling

Within 24 hours the wool is easily removed from the skin. Usually the skins are taken to the pulling board on trays or trucks, but a system of slow-moving chains which take the skins from the paint table to the pulling board is now being gradually introduced. This is a great improvement on older methods, as the only labour it requires is that of placing the skins on the chain and removing them at the other end.

The skin is opened up and thrown over a convex board fixed at approximately 45 degrees. With a sweeping motion of the hands the wool is pulled off, classed, and the classes thrown into their respective bins. (The further treatment of the wool is described later.) The pelts are then delivered to the pelt department.

Pelts

Depilating

The "green pelts" as they are known at this stage are placed in wooden or concrete dollies. The little sodium solution still on the pelts is sufficient to dissolve any wool which may still be adhering to edges and necks. Lime in the dollies penetrates the pelts through the epidermis, breaking up the proteins and swelling the pelts to give them a plump appearance. The old method of placing the green pelts in stacks to lime is being superseded by this 24-hour dolly process. After processing, the pelts are transferred to the bating dollies.

Deliming and Bating

The pelts are washed in dollies in soft cold water for a short period to remove any sodium and lime still adhering to them. The temperature of the water is then raised to 90 to 100 degrees F. and the bating material added. The action of the bating material is to remove the lime, causing the plumpness to disappear, and the pelts become soft and flaccid by the action of the enzyme trypsin in the bate. The paddle in the dolly is revolved slowly for approximately 2 hours during the bating process, after which the pelts are washed again in clean water.

Pickling

After a brief period of draining, the pelts are placed in dollies which contain a solution of sulphuric acid and salt in fixed quantities. The pelts immediately absorb the pickle, and further salt and acid is added during the process until the original chemical content of the pickle remains constant. This means that the pelts are saturated and thus are cured. During this process the pelts are continuously agitated by a slowly revolving paddle. A chemical test is usually taken on each dolly of pelts to verify complete curing, which takes about 2 hours. After curing, surplus moisture is drained from the pelts.

Fleshing

Fleshing is carried out mechanically. The pelt is hung over a rubber-surfaced roller and the flesh side is brought into firm contact with a rapidly rotating, right- and left-hand spiral knife cylinder. This revolves at not less than 1500 r.p.m. At the same time the rubber roller rotates slowly and delivers the skin back to the operator. (There are other types of fleshing machines, some requiring two operators to each machine.) The pelt is then delivered to the grading tables.

Grading

Pelts are graded according to which of the following three principal headings they come under:—

1. Free from all defects such as cockle, pinhole, machine breaks, prominent Corriedale rib, scores, high grain, broken grain, disease, etc. The pelt can be damaged to the extent of being graded down by pulling the animal round the yards by the wool and by general faulty handling in the works.

2. Area in square feet per dozen pelts.

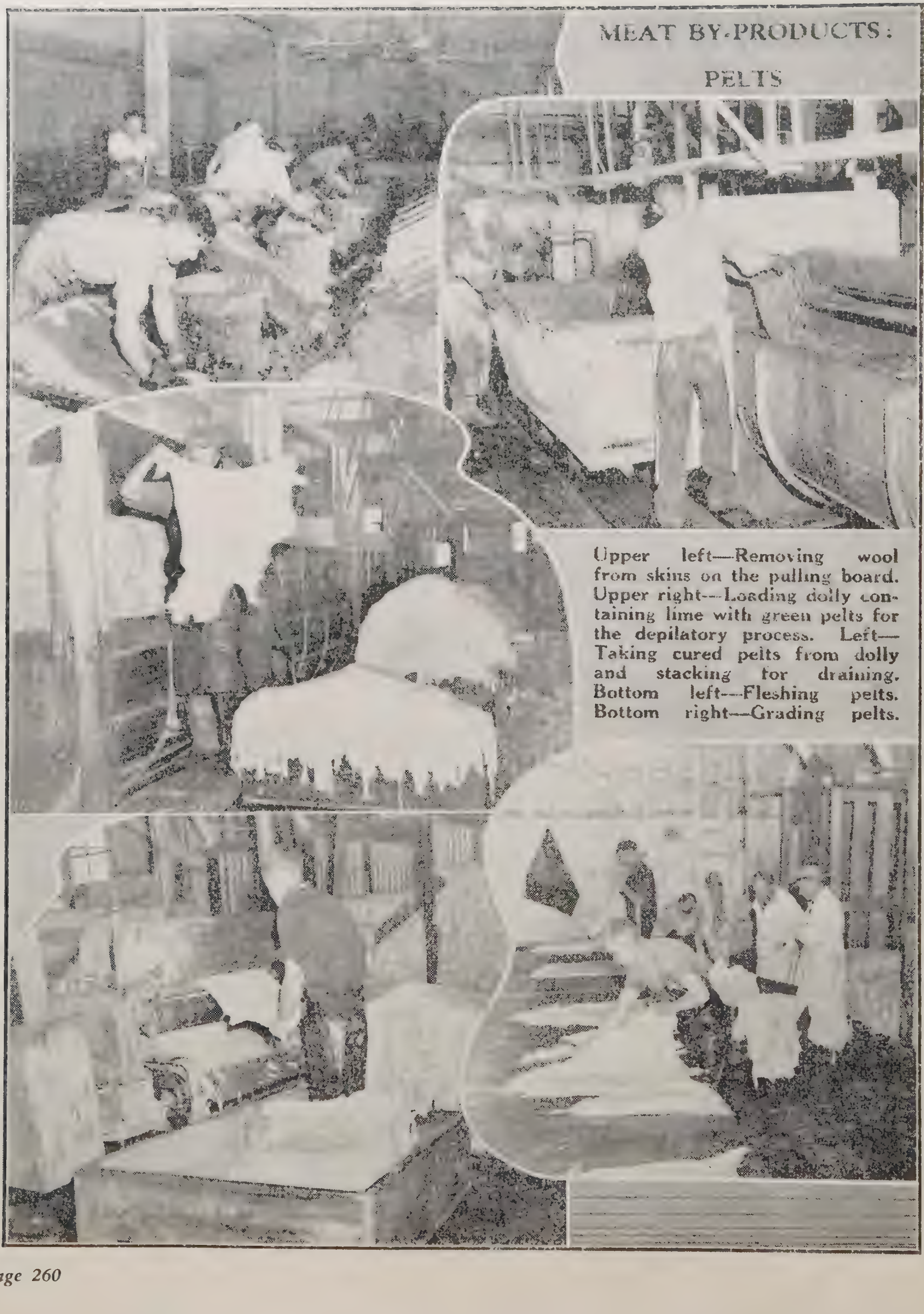
3. Thickness of the pelt.

From these headings approximately 12 grades for sheep and lambs are commonly used.

Left—Fleshing or flaying hides by hand. Right—Stacks of hides being salted.

MEAT BY-PRODUCTS:

PELTS



Upper left—Removing wool from skins on the pulling board. Upper right—Loading dolly containing lime with green pelts for the depilatory process. Left—Taking cured pelts from dolly and stacking for draining. Bottom left—Fleshing pelts. Bottom right—Grading pelts.

One method of stacking painted skins before pulling of the wool.

Packing

On the grading tables the pelts are rolled up into bundles of 6 in their respective grades and placed in bins until a sufficient quantity is on hand to pack into casks. During packing, medium coarse salt is lightly sprinkled around the bundles of pelts. Approximately 20 dozen sheep pelts or 42 dozen lamb pelts may be packed in a standard size cask.

Alternative Handling Procedures

There are several other methods of handling the pelts through the various processes, but that described is probably most commonly adopted. The pros and cons of each method are too detailed to go into, but they all centre around the stage of the processing at which the pelts are best fleshed. Some works flesh after depilating and before bating; others flesh between bating and pickling.

WOOL AND HAIR

Wool

In a freezing works as many as 70 grades may be used for slipe, washed, and scoured wools, and the method of classing is fundamentally the same as that of greasy wools. Certain points governing classification which are essential whether the classing is of greasy or slipe wools include: 1. The fineness of wool, 2. The strength of the fibre, 3. The length of the staple, 4. The softness or hardness (feel) of the wool, 5. Colour, and 6. Freedom from foreign matter. Simply, the slipe and washed wools may be graded into quarter-, half-, three-quarter, crossbred, Leicester, and Lincoln types, to which apply superfine, firsts, seconds, and washed thirds for quality; pelt, cloth, and comb for length; brands and light and heavy seed for condition. These grades are very elastic so that the packer may sort his wools to the best advantage. Each class of wool is delivered in bulk to the mechanical wool driers, where it is thoroughly dried by hot air, a process which requires up to 20 minutes, according to the type of drier. The wool is then delivered to the wool room, where it is placed in bins to cool before baling. Bales, which must not weigh more than 400lb., are pressed by hand or mechanical means, branded, and stored to await sale and shipping instructions.

Pie Wool

All the head, ear, cod, shank, and pullers' skin pieces which are too small to paint by the depilatory process are taken to the pie house, where under normal atmospheric conditions they are left to sweat in heaps about 9 to 12in. high. When the wool is easily pulled from the skin it is picked off the head, ear, and cod pieces by hand. Some works put the pieces in vats with hot water to quicken the bacterial action which loosens the wool root. The skin on the shank and pullers' pieces are left to decay away from the wool, which takes on a brown colour from the chemicals in the decayed skin. The wool is scoured in hot water to remove the fat which it absorbs. All the pie wools in their respective grades are then washed in cold water, wrung out, dried, and baled.

Hair

The body hair of cattle is removed by the tanners and put through a process of washing and drying to be used for felting or as a plaster retardent.

Cattle Tail Hair

Cattle tail hair, often known as curled hair, is largely used in upholstering motor-cars, in which comfort is all important.

The curled hair possesses several advantages: 1. It is permanently resilient, 2. It is permanently soft, 3. It is nonabsorbent, and 4. It is non-heating.

The hair may be clipped from the lower half of the tail, where it is over 4 to 5in. long, or, after scalding in water at 160 degrees F. for a few minutes, the long hair may be easily pulled out, washed, and placed on wire-netting racks in the open air to dry. When ready, the tail hair is baled up and sent to manufacturers, who process it into curled or fluffed hair. The long hair is often sold to mattress makers.

Ear Hair

Ear hair is not usually saved in New Zealand, but is saved to some extent in other countries. The delicate hairs inside the cow's ear are manufactured into artists' brushes.

Hog Hair

Most of the hog hair produced in New Zealand is destroyed at the works, because there is not a ready outlet for the processing of this product. Its uses are innumerable, but it mainly provides stuffing for upholstered furniture.

PHARMACEUTICALS

The science of glands and organs in both humans and animals is a highly technical one. A brief description of the action and work of some of these glands in the body is necessary to an understanding of their use and benefit to medicine as a pharmaceutical product.

The majority of the glands saved are classed as ductless or endocrine glands, which are scattered through various parts of the body. Products of these glands are known as internal secretions. Each of the ductless glands secretes a substance which exercises a particular effect upon the functions of the body and governs in some measure the orderliness of human and animal life and the conduct and character of the individual. Conditions such as cretinism, excessive or retarded growth, abnormal features, extreme nervousness, and idiocy can frequently be attributed to derangements of these glands. Should any gland fail to secrete its substance into the bloodstream, it is usually possible to make up the deficiency by feeding or injecting extracts of that particular gland into the body.

The active principles of the ductless gland secretions have been isolated in most cases and are known as hormones. These are very powerful in their action; even in microscopic quantities they produce effects, but the administration of these extracts in medicine is quite complicated.

There are many other glands not strictly endocrinal used in the preparation of pharmaceuticals and in several cases more than one product is prepared from a gland.

The frozen glands and organs as they are received from the works are prepared in the United Kingdom, Australia, U.S.A., and other countries under close supervision in laboratories especially set up to process them into pharmaceutical products.

Large quantities of glands are required to produce 1lb. of the finished product; for example, approximately 38 fresh beef suprarenal glands weigh 1lb. and about 25,000 glands or 12,500 cattle are required to prepare 1lb. of the dried finished product. To produce 1lb. of dried corpus luteum about 1500 ovaries are used. The value of such drugs may well be imagined. In New Zealand nearly all the glands and organs saved are from cattle and bobby calves. Their location and collection

MEAT BY-PRODUCTS: WOOL AND HAIR

Upper left—Unloading wool from hydros. Upper right—Operation of mechanical wool driers. Right—Turning pie wool to control the sweating process. Bottom left—Picking pie wool from skin pieces. Bottom right—Feeding pie wool into the rockers of a washing machine.

from the other meat-producing animals require some skill if they are to be efficiently carried out.

Endocrine Glands

Thyroid

The thyroid gland, which is situated on either side of the windpipe (trachea), consists of two maroon lobes connected by an isthmus of tissue. It has a controlling effect on the body heat, energy rate, growth and size of bones, intelligence, and in general the speed of living. If this gland enlarges in humans, it is called a goitre. The substance the thyroid secretes is thyroxin, deficiency of which will bring on certain lymphatic swellings and dwarfishness in certain cases. Too much secretion may cause digestive troubles, insomnia, and loss of weight, making the thyroid perhaps the most variable organ in the body.

Parathyroid

The parathyroid glands, which are near the thyroids, are four in number and about the size of a wheat seed. Their main work is to regulate the amount of lime in the blood and cells and the rate of coagulation of the blood. Their removal from the live animal would result in nervous spasms and eventually death. The extract of the gland is used in the treatment of tetanus, but is rarely saved in this country.

Thymus

The thymus gland is described in edible meat by-products as the sweetbread. Its pharmaceutical product is used in the treatment of rickets.

Pituitary

Found in the base of the brain, the pituitary gland consists of two lobes known as the anterior and posterior lobes. Each has a different function; the former is responsible for growth and is associated with sex glands; the latter has the ability to stimulate involuntary muscles, thus being valuable in obstetrical cases.

Pineal

The pineal gland is a cone-shaped tissue about the size of a pea hidden in a small cavity of the brain. Among other functions it regulates childhood growth. The pineal and pituitary glands are usually removed when the head is split open to extract the brain.

Suprarenal

Situated close to the kidneys, the two suprarenal glands are easily recognised by their yellowish fatty colour. The outer portion of the gland (cortex) is associated with general debility and emaciation and the inner portion (medulla) secretes a substance called adrenalin which may constrict the capillaries and temporarily raise the blood pressure. It is sometimes called the gland of combat because it quickens its secretions to control the nervous and muscular system at moments of pain, fear, and rage.

Sex Glands

The primary function of the ovaries and testes is to form reproductive cells for external secretion. They also secrete substances internally which control secondary sexual characteristics. This is shown by the castration of a ram lamb; the wether never develops the characteristics of heavy conformation and muscle of the entire ram.

The various extracts from these glands have been used in ovarian disturbances and it is possible with their use to induce lactation without pregnancy.

Other Glands and Organs

Pancreas

The pancreas is the most common of the glands saved, possibly because it is the most easily found in cattle, sheep, and pigs. The gland is situated within the abdomen. The substance it secretes internally regulates, among other things, the process of metabolism and the supply of sugar for the main organs of the body. Its pharmaceutical product is insulin, which is important for combating diabetes. Pancreas glands saved from bobby calves provide the best source of insulin and supply a potent product which is invaluable in the worst cases of diabetes because a small injection of it is equal to several injections of the standard product made from cattle glands.

Livers

All beef livers which have been rejected for edible purposes but are not badly diseased may be processed to derive a liver extract. The extract is used in cases of pernicious anaemia.

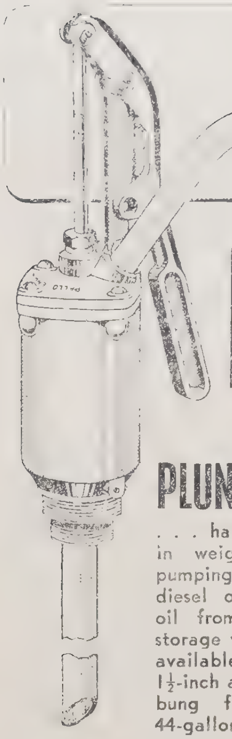
Gall

The gall bladders are carefully removed from the livers of cattle, sheep, and lambs, and are cut open over a sieve through which the gall or bile runs into a steam- or water-jacketed pan. It is then heated to 180 degrees F., which is maintained until the moisture content is reduced to 25 per cent., when it is run into casks to cool. Its extract, which is in the form of bile salts, is used in the manufacture of various medicinal preparations, and its value is estimated for this purpose on its cholic acid content. A common use of gall is in the manufacture of inks and dyes.

CASINGS

The casings of pigs, sheep, lambs, and cattle have long been valuable by-products of the industry, especially in the form of containers used by sausage manufacturers. In later years their value as various types of strings and surgical ligatures became apparent, thus establishing a firm secondary industry. In New Zealand for many

Below—Casks of pickled pelts for export.



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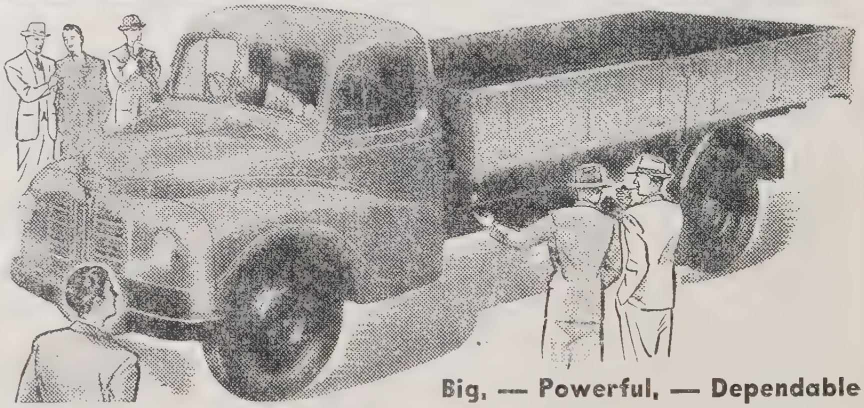

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years the buying and selling of casings have been monopolised by certain overseas firms and many freezing companies have been obliged to sell their casings to such firms on the killing floor. Competitive overseas prices in recent years have changed this position and many freezing companies are taking over the handling and processing of their own casings. A few of the larger works have been packing graded salted casings for some time, and, apart from local requirements, the bulk of the production has been exported to England, Canada, or U.S.A.

The casings are derived from various parts of the internal organs, some of which are enmeshed in the ruffle or crown fat, the function of which is to keep the organs in place in the live animal. The small intestine is saved from all meat-producing animals; only parts or some of the other casings, such as oesophagus, large intestine, stomach, and bladder are collected.

Threading, examining, and measuring length of casings.

Small Intestine

The small intestine of the mature ox is approximately 100 to 120ft. long; in the sheep it is up to 90ft. and in pigs up to 50ft.

The intestines are pulled or cut free from the ruffle fat without breaking or scoring them and in such a way as to leave the fat in its entirety as much as possible. After the intestines have been pulled and cooled in cold water they are stripped free of their contents by being run through the operator's fingers and then stripped again either by hand or machine.

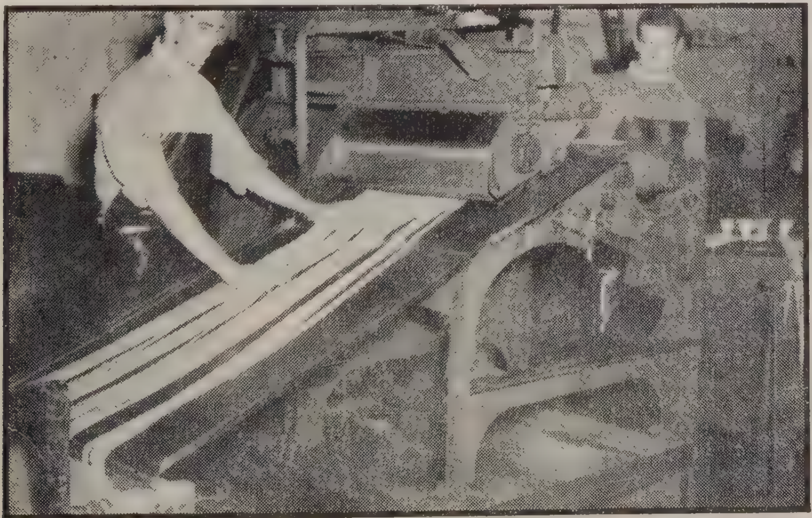
The intestines are cut into graded lengths and tied up in sets of 10. These are immersed in water about 50 degrees F. until the mucus on the muscular tissue is fermented or softened. This process may be shortened by using warm water, but over-fermentation will weaken the casing. Intestines may be fermented in brine solution; this has the advantage of eliminating the objectionable odour of the department.

The intestines pass through a cleaning machine to remove the mucus, and thorough cleaning usually involves running the intestines through the machine a second time, after which they are termed casings. The casings are placed in chilled salt solution until they are delivered to the tables.

On the grading tables the casings are expanded by water and graded by width or diameter. The casings may be divided into narrow, narrow medium, medium, and wide grades, a classification which is known as calibrating. Considerable extensions of these grades are made by the packers in measuring for length and calibre, as they must pack their products as competitive markets demand. After grading, the casings are salted down and packed into casks.

Careful handling and close supervision right through the processing are necessary to produce the greatest yield and at the same time preserve the most attractive colour.

Sheep and lamb intestines have several uses apart from sausage containers. Strings for nearly all types of musical instruments have been made from them for many years and before the Second World War there was much competition for them between U.S.A. and European countries.



Casings being scraped by machine to remove the mucous membrane after fermentation.

Tennis strings are an important product to this sporting country and a large percentage of New Zealand's requirements are made locally. It is said that the intestines from 11 lambs are used to produce sufficient strings for the racquet of a tennis player.

Intestines also have a medical value in the form of surgical ligatures. They are graded by hardness, as the surgeon uses that particular grade of ligature that will dissolve in the wound at the end of the desired period. The silky threads used by the surgeon are taken up or absorbed by the flesh of the patient.

Oesophagus

Better known as the gullet or weasand, the oesophagus, which is about 2 to 3ft. long, is the inside casing and is saved only from cattle. It is usually used as a container for cooked sausage meats.

Large Intestine

In cattle the large intestine may be divided into three parts. The caecum or bung is about 4 to 5in. in diameter; the colon is part of the intestine which carries on from the bung and slowly diminishes to 2in. in diameter; the rectum or wide middle is relatively short. All these, the last two to a less extent, are used in various forms as sausage containers. The colon or chitterling from the pig is saved as an edible product.

Stomachs

Apart from its use as tripe, the pig stomach is cleaned and used as a container, or processed further to yield the digestive ferment pepsin from the stomach lining.

Bladders

Cattle and pig bladders are inflated with air, trimmed, and dried to be used as containers for various materials.

(To be continued.)

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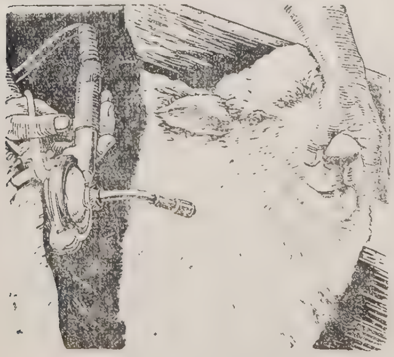

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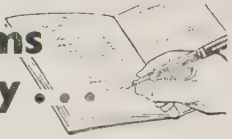

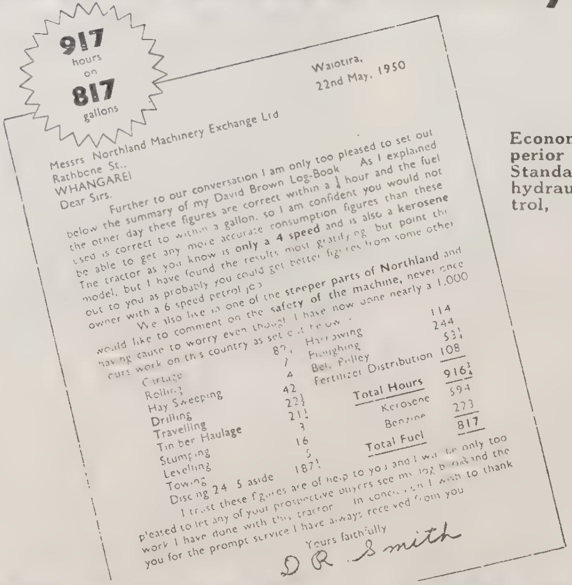

917 hours on 817 gallons

Waiotira,
22nd May, 1950

Messrs Northland Machinery Exchange Ltd
Rathbone St.,
WHANGAREI

Dear Sirs,

Further to our conversation I am only too pleased to set out below the summary of my David Brown Log-Book. As I explained the other day these figures are correct within a ¼ hour and the fuel used is correct to within a gallon, so I am confident you would not be able to get any more accurate consumption figures than these. The tractor as you know is **only a 4 speed** and is also a **kerosene** model, but I have found the results most gratifying, but point this out to you as probably you could get better figures from some other owner with a 6 speed petrol job.

We also live in one of the **steeper parts of Northland** and would like to comment on the **safety of the machine**, never once having cause to worry even though I have now done nearly a 1,000 hours work on this country as set out below:-

Cartage	87¼	Harrowing	114
Rolling	7	Ploughing	244
Hay Sweeping	4	Belt Pulley	53¼
Drilling	42	Fertilizer Distribution	108
Travelling	22½	**Total Hours**	916¾
Timber Haulage	21½	Kerosene	594
Stumping	3	Benzine	223
Levelling	16	**Total Fuel**	817
Towing	5		
Discing 24 5 aside	187½		

I trust these figures are of help to you and I will be only too pleased to let any of your prospective buyers see my log book and the work I have done with this tractor. In conclusion I wish to thank you for the prompt service I have always received from you.

Yours faithfully
D R Smith

Economy, reliability and superior quality in every way. Standard features include—hydraulic lift, fingertip control, automatic over-load clutch release, properly designed TRACTOR engine, force-feed lubrication, removable cylinder liners, 2-speed power take-off and pulley, 6-speed gearbox and 2-speed governor giving choice of 12 forward and 4 reverse speeds from 1 to 18 m.p.h., EL & SS, oversize tyres. Petrol or diesel engines.

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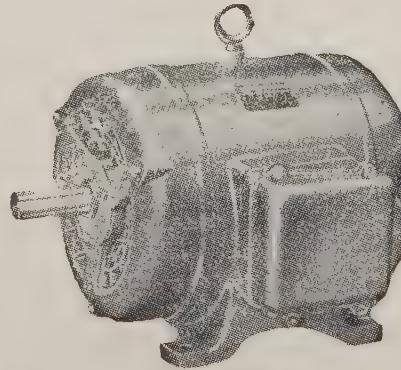

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ROOT AND GREEN FORAGE CROPS

SEASONAL NOTES Contributed by the EXTENSION DIVISION

PREPARATION of land for spring- and summer-sown root and green forage crops should be well advanced in most districts in September, but on light soils in the higher-rainfall districts the initial ploughing may often be delayed until October or even November. There are large areas of inferior grassland in most dairying districts which could well be ploughed, cropped, and resown to pasture, using Certified grass and clover seed. In such a programme root and green forage crops are useful both for supplementary feeding and for preparing the land for resowing to grass.

* * *

JAPANESE MILLET

In the warmer parts of the North Island Japanese millet is often a very useful supplementary feeding crop for dairy cows in January and February. The illustration on this page shows an 8-acre Taranaki field of millet. A crop of silage was cut from old grass on the field on November 20; the field was then ploughed and worked down and sown in millet on November 28. The crop was 10in. high on January 1 and gave excellent greenfeed during January and February for 100 cows. The field was ploughed and resown to grass on March 13.

* * *

HYBRID SEED MAIZE

As in the United States of America, outstanding results are being obtained in this country by using hybrid seed maize. The Department of Agriculture is now producing in New Zealand from single-cross parent material imported each year Certified seed of the double-hybrid known as Pfister No. 360. In a series of trials over a number of years this hybrid has out-yielded local strains of maize and has shown a high standard of quality and uniformity. For best results fresh hybrid seed should be sown each year instead of retaining seed from the crop produced from hybrid seed. Seed supplies of Pfister No. 360 are available from the Department of Agriculture, Gisborne, through seed merchants.

* * *

BRASSICA SEEDS

For the last 10 years New Zealand has been self-supporting in turnip, swede, and rape seeds and in chou moellier and kale seeds. The Department of Agriculture has supervised the production of most of the seed grown, and this produce has been distributed as either Certified or Government approved.

* * *

RAPE

Certified seed of three varieties of rape is available. The standard varieties are Broad Leaf Essex and Giant, and seed of Club Root Resistant is available for sowing where the presence of club root disease prevents the growing of a satisfactory crop of the other varieties.

* * *

SWEDES

Seed of six varieties of swedes is recognised as Government approved. The range covered is typical of the range of varieties imported before the war, and farmers requiring this crop for feeding over a period should grow more than one variety. Superlative, Grandmaster, and Crimson King are the standard varieties; Resistant is a late-maturing variety with some claim to disease resistance. Sensation is a deep-rooting, white-fleshed swede more suited to drier areas, and Calder is a locally bred variety released only in 1949. It is somewhat similar in performance to Sensation, but has a yellow flesh.

A field of Japanese millet used for summer supplementary feed.

CHOU MOELLIER

Two varieties of Certified chou moellier seed are Giant and Medium Stemmed. The Giant variety develops a larger and thicker "marrow-cored" stem, more suited to cattle feeding, whereas the Medium Stemmed variety is usually preferred for sheep feeding.

* * *

KALE

Seed of a selection of thousand-headed kale is recognised as Government approved. Kale retains its leaf growth longer into the winter than chou moellier, but its stem is more fibrous and rarely eaten by stock.

* * *

YELLOW-FLESHED TURNIPS

Five varieties of Government-approved seed of yellow-fleshed turnips are available. Purple Top Yellow and Green Top Yellow are hard-fleshed turnips of the imported Aberdeen types. Purple Resistant and Green Resistant are very similar, but possess a marked degree of resistance to club root. Soft Green Top Yellow under certain conditions is higher yielding than the other varieties, but its flesh is softer and its keeping qualities inferior.

* * *

WHITE-FLESHED TURNIPS

Government - approved seed of three varieties of white-fleshed turnips is available. Green Globe is the standard white-fleshed variety with a firm flesh and good keeping quality. Red Globe and Purple Globe are earlier maturing and more suitable for late-summer and early-autumn feeding.

* * *

GERMINATION OF GOVERNMENT-APPROVED BRASSICA SEEDS

Though Certified brassica seeds carry official tags showing the identification of the purity and germination certificate corresponding to the line, this information is not available with Government-approved seeds. With turnips, swedes, and kale, all Government-approved seed of each variety is made up into one blend before making the season's deliveries, and the germination of the seeds

ROOT AND GREEN FORAGE CROPS . . .

being distributed for the coming sowing season is as follows:—

THOUSAND-HEADED KALE: over 90 per cent.

SWEDE:

Superlative	all 90 per cent. or better
Grandmaster	
Crimson King	
Calder	
Resistant 88 per cent.	
Sensation 85 per cent.	

YELLOW-FLESHED TURNIP:

Green Top Yellow	all 90 per cent. or better
Soft Green Top Yellow	
Green Resistant	
Purple Top Yellow	
Purple Resistant 85 per cent.	

WHITE-FLESHED TURNIP:

Green Globe	all 90 per cent. or better
Red Globe	
Purple Globe	

All packets of Government-approved turnip and swede seeds being distributed to retailers this season carry the identification letter V.

Grass Seed Crops

Applications of sulphate of ammonia at closing time appreciably increase yields of grass seed crops. An increase of about 3 bushels per acre may be expected for ryegrass from an application of 1cwt. of sulphate of ammonia, and some trials have shown an increase of 7 to 8 bushels from 1½cwt. Cocksfoot fields for seed which are not normally grazed benefit to an even greater extent from sulphate of ammonia topdressings. In this crop yields have been increased by 140lb. through the application of 1cwt. of sulphate of ammonia in the autumn and a similar dressing in the spring.

Trace Elements

Officers of the Extension Division have observed that some farmers are experimenting with applications of trace elements to pastures. The danger of doing so without informed advice is very real. Application of sodium or ammonium molybdate to soils already well provided is likely to render pasture poisonous to stock. Similarly ill-advised application of copper sulphate can result in stock mortality. Both zinc and manganese can be poisonous to plants. No experimenting with trace elements should be carried out without the local Instructor in Agriculture being consulted first.

SHOW DATES

THE following are dates and venues of A. and P. shows up to the end of December.

October 14—Ellesmere A. and P. at Leeston.
*October 18 and 19—Hawkes Bay A. and P. (spring show) at Hastings.
October 21 Rangiora A. and P. (centennial show) at Rangiora.
October 26, 27, and 28 Waikato A. and P. at Hamilton.
October 27 and 28—Marlborough A. and P. at Blenheim.
October 27 and 28—Wairarapa and East Coast P. and A. at Carterton.
*October 28—Timaru A. and P. at Timaru.
*November 2—Ashburton A. and P. at Ashburton.
November 4—Amberley A. and P. at Amberley.
November 7 and 8—Thames Valley A. P. and H. at Te Aroha.
***November 8, 9, and 10—Canterbury A. and P. (Royal Centennial Show) at Christchurch.**
November 10 and 11—Wanganui A. and P. at Wanganui.
November 10 and 11—Whangarei A. and P. at Whangarei.
November 15—North Otago A. and P. at Oamaru.
November 17 and 18—Auckland Metropolitan A. and P. (spring show) at Auckland.
November 17 and 18—Nelson A. and P. at Nelson.
*November 17 and 18—Egmont A. and P. at Hawera.
November 18—Waimate A. and P. at Waimate.
November 18—Bay of Islands P. and I. at Waimate North.
November 18—Taieri Agricultural Society at Outram.
November 21 and 22—Otago A. and P. at Dunedin.
November 24 and 25—Stratford A. and P. at Stratford.
November 25—Kaikohe A. P. and H. at Kaikohe.
November 25—Kelso A. and P. at Kelso.
December 2—Winton A. and P. at Winton.
December 2—Motueka A. and P. at Motueka.
December 2—Tokomairiro A. and P. at Milton.
December 2—Whangaroa A. and P. at Kaeo.
*December 5 and 6—Gore A. and P. at Gore.
December 9—Wyndham A. and P. at Wyndham.

* The Department of Agriculture exhibit will be staged at this show.

Preventing Heifers from Turning in Bail

MANY farmers experience some difficulty during the spring months in breaking in heifers to the milking shed. There is a tendency on the part of heifers to turn round in the bails, with the result that there is a general upset in the shed and much interference in the milking routine. A solution to this problem has been worked out by Mr. A. W. Hodder, of Waipapa.

A 10in. x 1in. board about 3ft. long is shaped as in Fig. 1 and braced top and bottom with 2in. x 1in. timber. The board is fastened to the side of the dummy by strap hinges. After the heifer has been bailed in the normal way the board is swung into position (Fig. 2), making it impossible for the heifer to get her head past the head of the dummy.

When the heifer is released in the normal manner the board swings back alongside the dummy, being pushed there as the animal moves foward (Fig. 3).

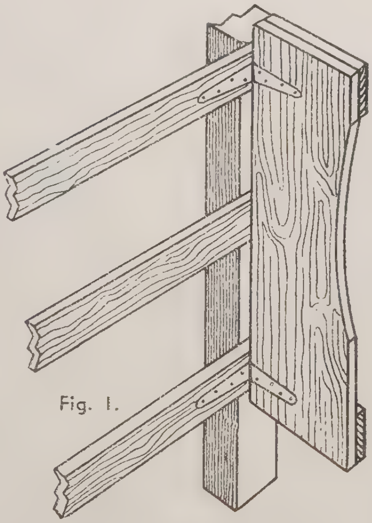


Fig. 1.

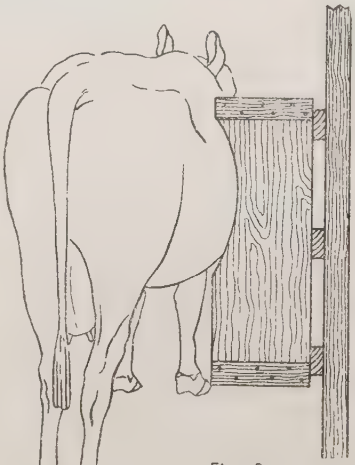


Fig. 2.

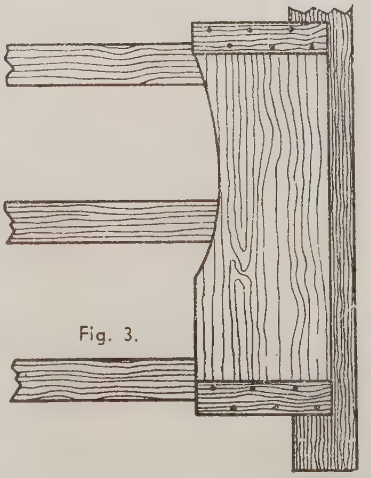


Fig. 3.

—*C. CORP, Farm Dairy Instructor, Department of Agriculture, Kaikohe.*

Increasing the Number of Hives in an Apiary

Seasonal Notes for the Domestic Beekeeper

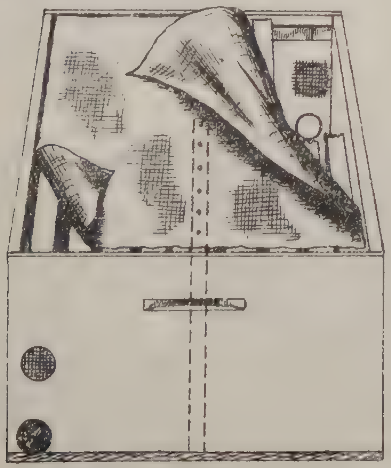
THERE are many methods used for increasing the number of hives; some require a high degree of skill, but others can be carried out successfully by the domestic beekeeper provided recognised procedure is followed. In this article R. Goddard, Apiary Instructor, Department of Agriculture, Tauranga, outlines methods most suitable for the domestic beekeeper.

IT is a comparatively simple operation to increase the number of hives in an apiary if the right time and favourable conditions are chosen. Unfortunately inexperienced beekeepers often attempt to increase the number of colonies too rapidly, with disastrous results. Domestic beekeepers are advised, therefore, to increase gradually to avoid costly mistakes.

Similarly, increasing in autumn should not be attempted other than by an experienced beekeeper, as weak colonies are not in good condition to survive the winter. They are also prone to attacks by robber bees, the possibility of starvation, and the likelihood of a sudden cold snap chilling brood in the hive.

Therefore, domestic beekeepers desiring to increase their number of hives are advised to carry out this work in spring or just before the main honey flow. At this time hives are usually fairly strong and there is some source of nectar available to the bees. If possible, it is a good plan to increase in the swarming season, as two objectives are achieved with the one operation; that is, swarm control and increase in the number of colonies can be combined successfully.

Hives should have at least two full boxes of bees and brood before they are used for establishing further colonies. This point cannot be stressed too strongly, as the domestic beekeeper frequently divides weak hives, with the result that both hives die or are robbed out, leaving the beekeeper without a colony. Strong hives selected for making increase should be examined thoroughly for foul-brood disease. Officers of the Department of Agriculture are constantly finding cases where this serious bee disease has been spread by careless beekeepers splitting diseased hives or transferring brood from them to other colonies.



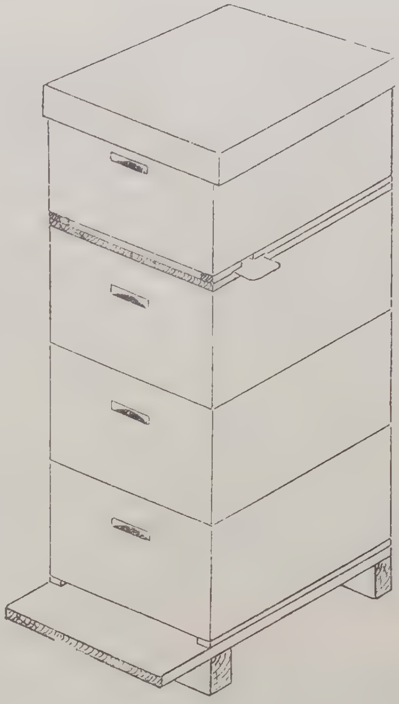
Hive box converted to house two nuclei.

Dividing Hives for Increase

When a strong hive has been selected for increase it can be divided equally by taking away half the brood, stores, and bees and using them to form a new colony. With this method it is not necessary to find the queen, as the queenless colony will soon start to build queen cells. Unfortunately queens reared under this system usually turn out to be of an inferior quality. However, if the beekeeper is capable of finding the queen, the following method of division is recommended. The queen, with a frame of bees and brood, should be removed from the strong colony and placed in a nucleus box for safe keeping. When the bees in the parent hive realise they are queenless they immediately begin building queen cells. On the ninth or tenth day the hive can be divided equally and if it is desired to replace the queen in the original colony, this can be carried out successfully, providing all queen cells are destroyed. The other portion should be left with two or three of the largest queen cells and the entrance should be closed temporarily with grass.

Nucleus Hives

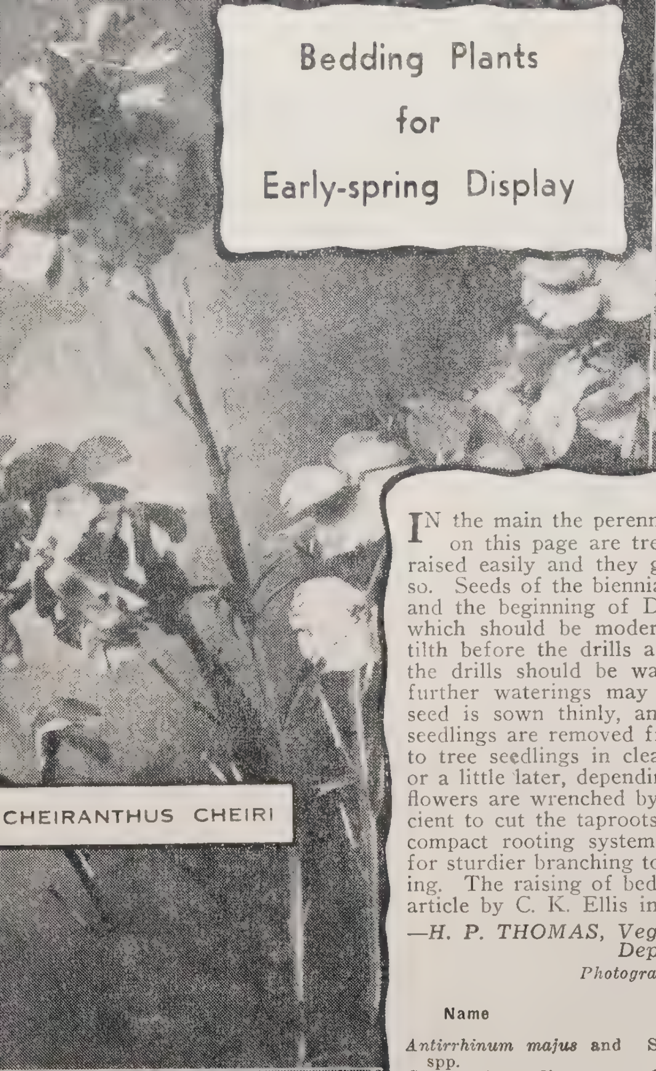
Nucleus colonies are invaluable in all apiaries and domestic beekeepers are advised to have at least one or two which can be used to unite queenless hives or to help build up a backward colony. Once it has been decided to increase, consideration should be given to the type of equipment which will be required. To hive nuclei it is not necessary to spend further sums of money on additional equipment. An ordinary super fitted lengthwise with a division board through the centre will house two nuclei satisfactorily. The bottom of the super can be boarded up completely and two holes bored in the super will serve as an exit for the bees. However, with this method the super is generally ruined for other purposes. An alternative method is to make a floor board similar to the standard bottom board except that it is constructed with light timber and with ½in. strips on the outside. Holes cut in these strips will serve as an entrance. For the domestic beekeeper who has a limited amount of space in which to place his hives, this type of board can be used effectively on top of an established colony. A hole cut in the centre of the board and covered with gauze on either side will not only prevent the bees from attacking each other, but will allow the warm air to rise into the nuclei.



Nucleus placed over dividing board on top of established hive.

Nucleus hives can be made by taking two or three frames of brood and bees and one frame of honey and pollen from a selected hive. However, if it is not desired to weaken one hive, frames of brood and bees may be taken from several different hives, but care should be taken to ensure that the queen is not removed. Beekeepers with black or crossbred bees are advised to purchase good Italian queens from some reputable queen breeder and, provided equipment is ready, it is a simple matter to prepare the nucleus and to introduce the new laying queen. Failing this each nucleus should be given a ripe queen cell. Each newly prepared nucleus colony should have the entrance blocked with grass to prevent a complete evacuation of all field bees in the first 2 days. Nuclei established in this way provide a reserve of young queens, brood, and bees which may be used to advantage where honey-producing hives need a new queen or a boost in brood and bees at critical periods during the breeding season.

Bedding Plants for Early-spring Display



CHEIRANTHUS CHEIRI

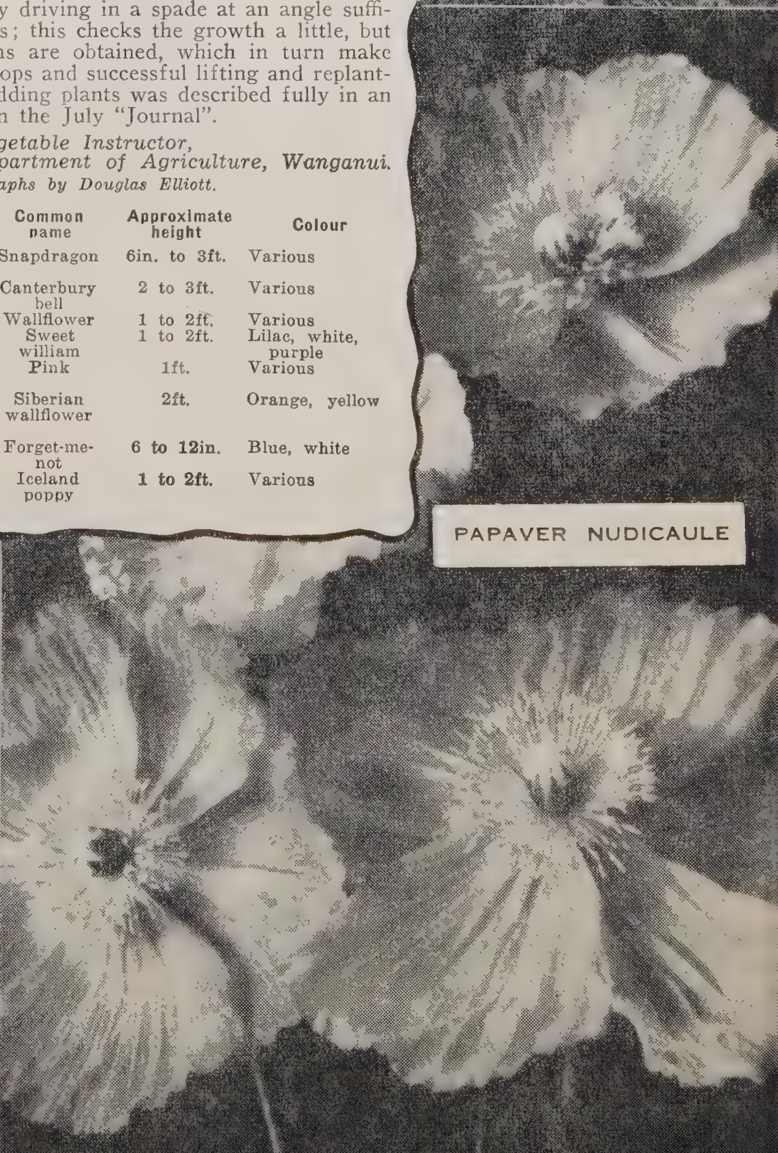
DIANTHUS PLUMARIUS

IN the main the perennial and biennial bedding plants listed on this page are treated as annuals because they can be raised easily and they grow and bloom better when treated so. Seeds of the biennials are sown at the end of November and the beginning of December in frames or open ground, which should be moderately rich and broken up to a fine tilth before the drills are prepared. If the weather is dry, the drills should be watered before the seed is sown, and further waterings may be necessary during summer. The seed is sown thinly, and about the middle of January the seedlings are removed from the drills and lined out similarly to tree seedlings in clean ground. At the end of February or a little later, depending on the growth of the plants, wallflowers are wrenched by driving in a spade at an angle sufficient to cut the taproots; this checks the growth a little, but compact rooting systems are obtained, which in turn make for sturdier branching tops and successful lifting and replanting. The raising of bedding plants was described fully in an article by C. K. Ellis in the July "Journal".

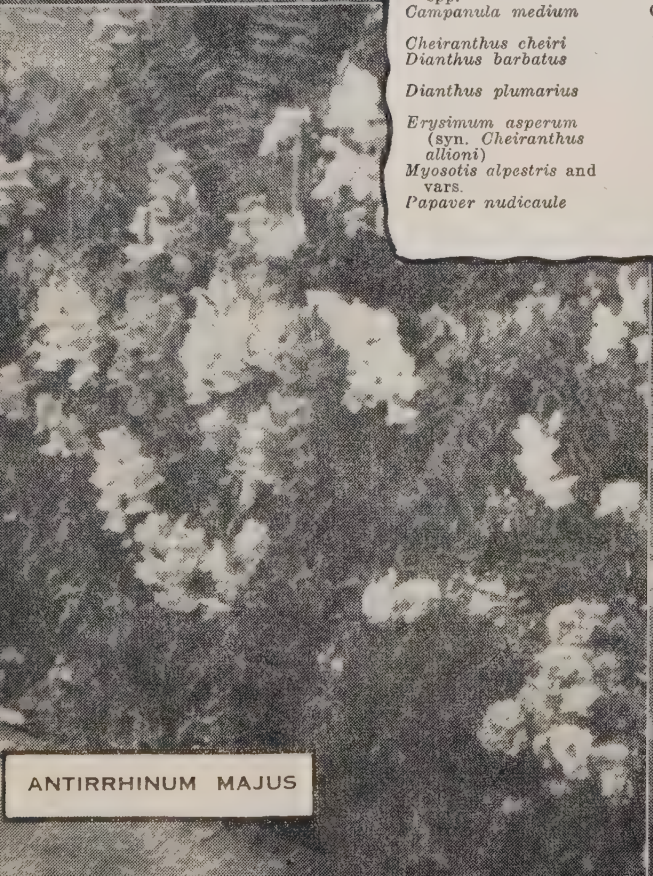
—*H. P. THOMAS, Vegetable Instructor,*
Department of Agriculture, Wanganui.

Photographs by Douglas Elliott.

Name	Common name	Approximate height	Colour
Antirrhinum majus and spp.	Snapdragon	6in. to 3ft.	Various
Campanula medium	Canterbury bell	2 to 3ft.	Various
Cheiranthus cheiri	Wallflower	1 to 2ft.	Various
Dianthus barbatus	Sweet william	1 to 2ft.	Lilac, white, purple
Dianthus plumarius	Pink	1ft.	Various
Erysimum asperum (syn. *Cheiranthus allioni*)	Siberian wallflower	2ft.	Orange, yellow
Myosotis alpestris and vars.	Forget-me-not	6 to 12in.	Blue, white
Papaver nudicaule	Iceland poppy	1 to 2ft.	Various



PAPAVER NUDICAULE



ANTIRRHINUM MAJUS

The Flower Gardener's Tasks in October

WITH the weather becoming warmer and risk of frosts receding during October in most districts of New Zealand, the treatment of young plants—their hardening off, planting out, and thinning—is a subject which recurs frequently in this month's article for the flower gardener by C. K. Ellis, Horticulturist, Department of Agriculture, Dunedin. Advice is also given about the combating of pests and diseases which are likely to be troublesome at this season.

ANNUALS sown in the open during September should have germinated by the middle of October. As soon as the seedlings can be handled easily they should be thinned to about 2in. apart; the seedlings removed may be used to fill any gaps which have occurred. When the plants have established themselves more firmly they should be thinned again. Dwarf varieties such as alyssum should be thinned to a minimum of 8in. apart and vigorous types such as godetias should not be less than 18in. apart; 10 to 12in. is adequate spacing for such types as cornflowers, candytuft, and pot marigolds. If plants are allowed to grow too closely, they starve each other, premature flowering is induced, and the plants seed and die at an early stage.

Bedding plants may be planted out from their boxes in October, but in districts which experience late frosts it is advisable to delay the planting out of such tender varieties as salvias, petunias, and zinnias until the risk of these frosts is past. The plants should be thoroughly hardened off in the boxes before they are planted out by being left for a period in a cold frame or stood in the open protected by a scrim cover. Such hardened plants are less likely to be damaged by light frosts than are those planted out directly from a glasshouse. Boxes of bedding plants should be watered thoroughly a few hours before they are planted out to ensure that they are not short of moisture and to make lifting the plants from the boxes easier and less likely to cause damage to the roots.

Biennials such as sweet william, myosotis, and Canterbury bells can be sown in boxes outdoors during October.

[*Douglas Elliott photo.*

Rhododendron White Pearl contributes much to the charm of this attractive corner. Evergreen shrubs such as rhododendrons are best transplanted in early spring.

Begonia cuttings rooted in the greenhouse can be potted up into 3in. pots as soon as the roots are considered to be developed sufficiently. The potting mixture recommended in the article on begonias in last month's "Journal" should be used.

Chrysanthemum cuttings made and inserted in the rooting medium during September should have rooted by about 3 weeks from the date of planting. They should be hardened off preparatory to being planted out. At the time of planting the tops should be nipped out of any plants which have not begun to produce side shoots. Where frosts are severe it is wise to delay the planting out of newly rooted cuttings until November. Old chrysanthemum plants left in the border from last year should have the number of shoots reduced as soon as they are a couple of inches high. There is still time to lift and divide old clumps if the shoots are not more than a few inches long. In the borders chrysanthemums should be planted in groups of 3 and 4 plants of the same variety so that an appreciable amount of the one colour will be showing at flowering time.

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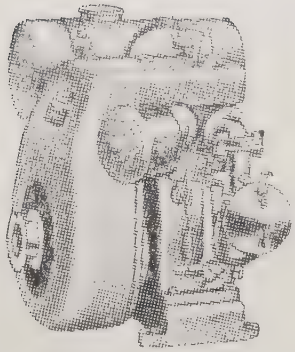

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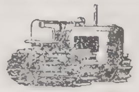

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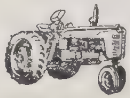

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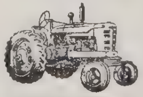
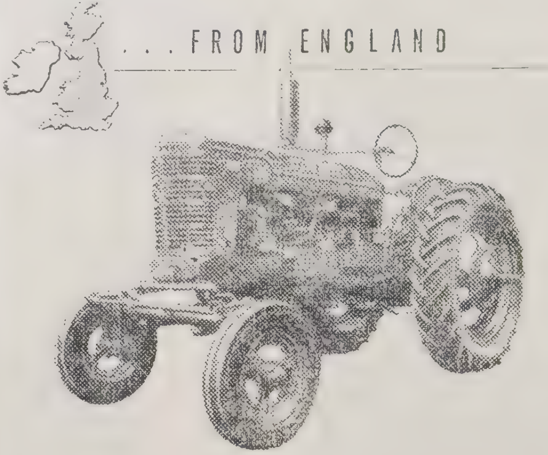


FROM ENGLAND
Hay Balers, Tractors, Green Crop Loaders



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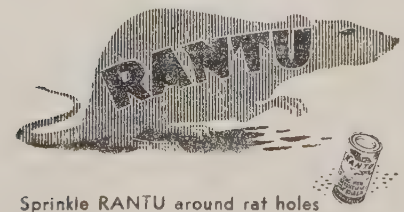
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Dahlia tubers boxed up in a warm place during August and September will be making good growth of new shoots. Some of these shoots may be removed to be used as cuttings, and the clumps of tubers can still be pulled apart to be replanted as separate plants. Care should be taken to ensure that each piece that is divided off has at least one strong shoot.

Fuchsias should be pruned during October if the work has not been done already. All old, dead, weak, or straggly shoots should be cut out. Healthy shoots should be shortened back, the strongest ones to about 6in. and the weaker ones to about 1in. from their bases.

Evergreen shrubs are best transplanted in early spring. A few shoots or branches should be removed to relieve the burden on the roots, and the hole should be dug large enough to take the roots fully outspread. When transplanting is finished the new soil level should be at the position on the stem marked by the old soil level.

Geraniums, though they tolerate a certain amount of frost on their leaves, are killed readily by severe frosting of the roots. In cold districts plants lifted in autumn and stored in a frost-free place should be planted out again in October. The plants should be cut back rather severely to encourage vigorous new growth and shapely bushes.

Gladiolus planting can be continued during October in any district.

[*Photo News Ltd. photo.*

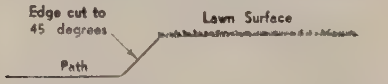
Geraniums should be cut back severely to encourage vigorous new growth and shapely bushes.

[*Douglas Elliott photo.*

Rhododendron fragrantissimum is a hybrid which bears very large, scented, white flowers in early summer. Rhododendrons often set seed after flowering, and the developing seed pods should be picked off as soon as they are seen.

Herbaceous plants such as delphiniums, lupins, pyrethrums, and hollyhocks can be raised readily from seed sown in open beds or in boxes or pots outside during October. All named varieties must be propagated vegetatively, and cuttings of young shoots taken from the growing plants in spring will root easily in a cold frame.

Lawn edges should be trimmed each spring by cutting them at an angle of about 45 degrees away from the grass. This ensures a firm edge that will not break away when trodden on or when the lawnmower wheel accidentally runs over it. This trimming should not be done until possibility of frosts has passed because frosts loosen or "heave" the soil.



Rhododendrons often set seed after the flowers have faded. The seed pods should be picked off as they develop. Old, straggly bushes can be cut back hard as soon as the flowers fade. This means that no blooms will be obtained next year, but the mass of young growth that results will soon build a shapely new bush.

Water lilies grown in baskets or tubs may be removed from the water this month and have most of the mud washed away from them and replaced with equal parts of good garden soil, well-rotted animal manure, and sharp sand. The roots should never be allowed to dry out during this operation. While the water lilies are out a good opportunity is provided to clean out the pool.

THE FLOWER GARDEN IN OCTOBER . . .

Pests and Diseases

Greenflies (aphides) are likely to appear in numbers during October on a variety of plants, including roses. At first appearance this pest should be sprayed, preferably on a warm day, with nicotine sulphate at the rate of 1 part in 800 parts of water, or ½ fl. oz. to 2 gallons of water. To each 2 gallons of this mixture should be added 1oz. of soft soap or 3 fl. oz. of summer (white) spraying oil. This spraying should be repeated at 10-day intervals until all traces of the greenflies have disappeared.

[*Green and Hahn Ltd. photo.*
Looper caterpillars are so called because they arch their bodies and move in a series of loops.

Looper caterpillars, the larvae of the silver Y moth, are very troublesome on a wide range of garden plants during spring. They are often common on dahlias, geraniums, and salvias. The caterpillars grow to about 1¼in. long, are light green with white and darker green stripes on their backs, and are almost hairless. They eat from the lower surfaces of the leaves, leaving only a thin skin of upper epidermis which ultimately dies and falls out, leaving holes. When moving about the caterpillars arch their bodies and proceed in a series of loops. They can be controlled by spraying with a mixture of 2lb. of arsenate of lead powder to 100 gallons of water. Dusting with D.D.T. or derris is also effective.

Slugs and snails become very numerous and do a great deal of damage during spring, especially to young plants and seedlings. Hedgehogs, natural enemies of slugs and snails, destroy appreciable numbers of them, but the best method of control probably is the use of poison baits. Metaldehyde, sold as solid fuel in oblong white tablets, is extremely poisonous to slugs and snails. One tablet should be crushed and mixed with 2 handfuls of wheat bran or dried blood and the mixture sprinkled lightly over the areas frequented by the pests. If rain falls within 24 hours of making the application repetition of the treatment may be necessary.

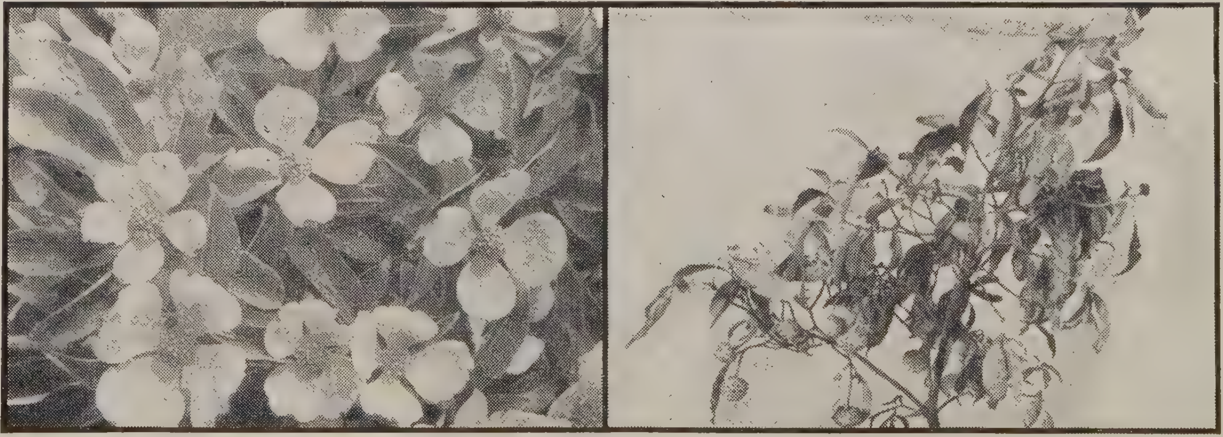
Tulip "stripe" or "breaking" is a virus disease transmitted from plant to plant by greenfly. The flowers develop abnormal streaks of colour and the bulbs, though they usually continue to grow and multiply, will never be free from the disease. The home gardener should watch carefully for streaked buds, and if any appear, the plants, including the bulbs, should be dug out and burnt immediately. A careful watch should be kept for greenflies feeding on the foliage or flowers, and a spraying with nicotine sulphate should be given at their first appearance.

A tulip bulb which bears blooms "broken" or "striped" like this one should be dug out and burnt.

Lath Blind for Greenhouse

In the caption to an illustration of a lath blind for a greenhouse on page 167 of the August "Journal" the dimensions of the timber to be used were stated wrongly. The size of lath recommended is 1in. x ¼in.

Flowers and Fruits of *Cornus capitata*



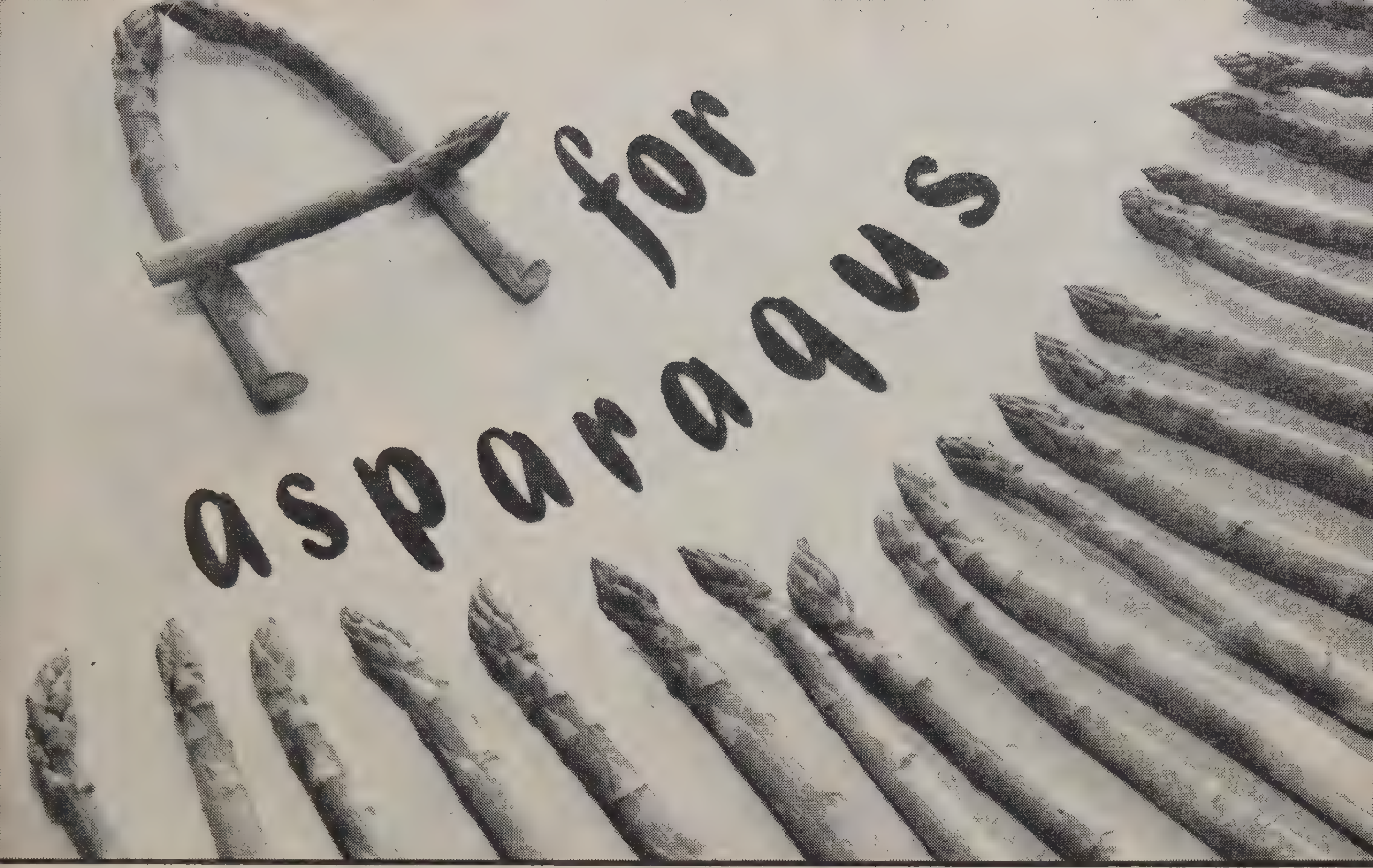
POPULARLY known as the Himalayan strawberry tree, as it is a native of northern India, *Cornus capitata* (syn. *Benthamia fragifera*) is a very ornamental garden subject. In time it may grow to a height of 15 to 20ft., but it can be kept to a reasonable size by pruning back excess growth. It is worth a place in most gardens in New Zealand, particularly in the milder coastal districts.

Its main attraction is the reddish-yellow to crimson strawberry-shaped fruits produced in spring and early autumn. The flowers, though inconspicuous in themselves, are set in large sulphur-yellow bracts which are produced during late winter and look very effective amid the characteristic grey-green foliage.

Shrubby kinds may be propagated by cuttings of firm shoots inserted outdoors in autumn in sandy soil. Seeds may be sown from the ripe fruit, and layering lower branches is a method used by some nurserymen.

—*H. P. THOMAS, Vegetable Instructor,*
Department of Agriculture, Wanganui.

Photograph on left by Douglas Elliott.



A for asparagus

OF recent years the cultivation of asparagus in New Zealand has become much more widespread and this vegetable, once rather scarce, is used much more frequently. In this article Eva Topping, Rural Sociologist, Department of Agriculture, Auckland, describes a variety of attractive ways of serving asparagus.

ODDLY enough, though asparagus has been regarded as a luxury dish, it is one of the oldest known vegetables, for it was mentioned by writers of Roman times, who praised its values both as a medicinal plant and as one of the delights of the epicure's table. The wild varieties grew in the marshes, but the gardeners of those early times had so improved on nature that spears weighing three to the pound were recorded. The invading Romans introduced asparagus to other European countries, where it soon became a prized vegetable.

Later writings on horticultural subjects make it clear that asparagus was in general use in most parts of Europe some 400 years ago, and the reputed size and substance of the spears, heavier than ½lb. each not being uncommon, would make many of the present varieties appear puny. In France, Germany, Holland, and England wild asparagus flourished and was used by the humble while it was cultivated in the gardens of the great.

Settlers carried the seeds of the plant to America, and as long ago as 1672 a writer giving a list of plants "which had sprung up since the settlers planted" said that "asparagus thrives exceedingly."

How to Cook Asparagus

The spears should be washed in running water to free the stems of any soil or sand. The tough end of the stem is cut off and the coarse lower scales removed with the point of a sharp knife. Grade the spears into groups of 8 or 9, keeping the size fairly uniform, then tie them in bundles with tape or string. Place the bundles in boiling salted water, cover them, and cook them rapidly for 10 to 15 minutes, according to their age and thickness. Frequently the larger spears are younger and more tender than the thinner ones and cook more quickly. Do not overcook asparagus or the heads drop off the stalks. Lift the bundles out of the water, drain them, untie the threads, and lay the asparagus on a heated dish. Serve it with melted butter poured over the heads and top parts of the stalks.

The dish may be varied by using one of the following sauces:—

Hollandaise or Dutch Sauce

2 egg yolks
1 tablespoon of lemon juice
Shake of cayenne pepper
2 tablespoons of top milk
3 tablespoons of butter
Pinch of salt

Removing tough scales in the preparation of asparagus for cooking.

[Photographs on this page by Sparrow Industrial Pictures Ltd.

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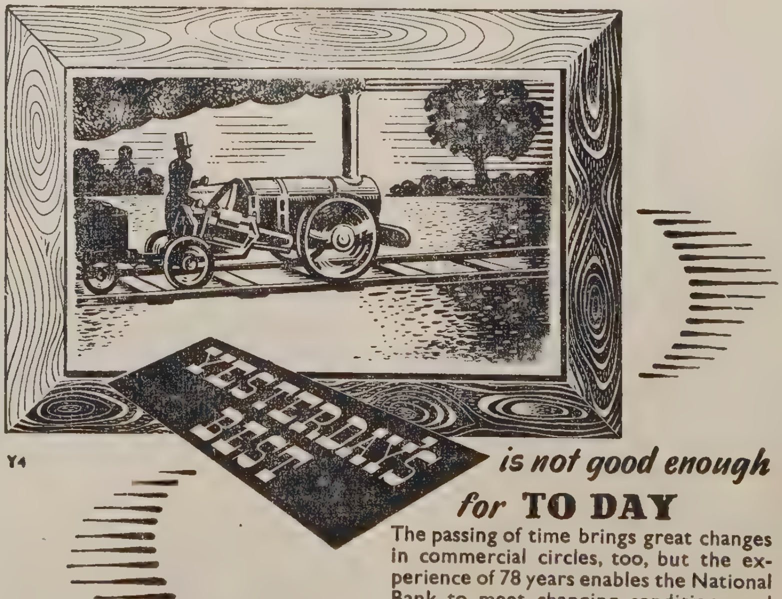

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ASPARAGUS SALADS AND SOUPS

Put all the ingredients except the butter into the top of a double boiler or in a basin standing in a saucepan of boiling water over low heat. Beat the mixture until it begins to thicken, then add the butter little by little while continuing the beating. Take care not to have too much heat or to overcook the sauce, or it will curdle. A smooth, velvety sauce is the cook's aim.

Cheese Sauce

2 tablespoons of butter
2 tablespoons of flour
1 cup of milk
½ cup of grated cheese
Salt and pepper

Melt the butter in a saucepan but do not brown it. Stir in the flour, then add cold milk a little at a time, stirring constantly. Cook the sauce until it is smooth and thickened. Remove it from the heat and stir in the grated cheese.

Asparagus for Salads

Served cold as salads, asparagus makes delightful spring lunches.

Individual Asparagus Salads

Cook the asparagus and leave it to cool, allowing about 5 spears to each person.

Prepare hard-boiled eggs—½ or 1 per serving. Cut the cooled eggs lengthwise and take out the yolks. Slice a small piece from the white so that the halves stand steady on the plate and nick the cut edges with a sharp knife to make a fancy border. Fill the whites with mayonnaise (the recipe for which is given at the end of this article) or other salad dressing. Arrange the cold asparagus on beds of shredded lettuce on individual salad plates. Set the filled egg white to one side. To decorate the platter force the hard-boiled yolk through a fine sieve held over the asparagus.

Asparagus Bowl Salad

1 lettuce
20 asparagus spears
½ cup of top milk or cream
¼ cup of tomato sauce
3 spring onions
2 teaspoons of lemon juice
1 tablespoon of chopped parsley
Salt and pepper

AN INDIVIDUAL ASPARAGUS SALAD

Cook the asparagus and cool it. Cut the stems to leave about 3in. lengths of head and cut the stalk ends into ½in. pieces. Shred the lettuce and chop the onions finely. Mix the short pieces of asparagus, lettuce, and onion in a salad bowl and arrange the head ends of asparagus on top with the ends to the centre of the bowl and the tips pointing outward like the spokes of a wheel.

For the dressing mix the tomato sauce, lemon juice, salt, pepper, and milk or cream lightly together, pour it over the salad, and sprinkle it with parsley.

Asparagus Soups

Clear Asparagus Soup

1 pint of beef stock
12 to 15 asparagus spears
1 carrot
1 slice of turnip
1 sprig of parsley

Skim the stock of all fat, put it into a saucepan with the cut-up vegetables and parsley, and cook it for about 20 minutes. Meantime prepare the asparagus and cut the stalks into inch lengths. Strain the soup stock through muslin to clear it, return it to the saucepan, add the less tender pieces of asparagus, bring the soup to the boil, and simmer it for 10 minutes. Add the tips of asparagus and cook the soup for another 8 to 10 minutes until the asparagus is tender but still whole.

Cream of Asparagus Soup

1 bundle of asparagus
1 tablespoon of chopped onion
2 cups of thin white sauce
Salt and pepper

Prepare the asparagus, put it into a saucepan with the chopped onion, just cover it with boiling water, and cook it until it is tender. Strain off the liquor and cut off the tips and reserve them. Mash the remainder of the asparagus through a colander and add it to the liquor, which should measure 1½ cups; make up the required amount with hot water if necessary. Add the hot white sauce to the liquor, return the mixture to the saucepan, heat it to near boiling, then put in the asparagus tips and serve it. A teaspoonful of unsweetened, whipped cream may be floated on each serving.

Cold Asparagus Soup

1 quart of vegetable water or stock
1 bundle of asparagus
Pepper and salt
½ pint of white sauce
A few cooked peas

Chop the asparagus stalks and reserve the green tips. Bring the stalks to the boil in the vegetable water or stock, cook them for 30 minutes, strain the liquor, and rub the pulp through a sieve or colander. Reheat the liquor, add the asparagus tips, season it, and cook it for 10 minutes. Take out the tips and pour the soup on to the white sauce, stirring it well. Pour it into soup cups and garnish it with asparagus tips and green peas. Set the cups in a cool place overnight or chill the soup in the refrigerator.

ASPARAGUS WITH HOLLANDAISE SAUCE

(Photographs on this page by Sparrow Industrial Pictures Ltd.

ASPARAGUS SAVOURIES

Asparagus rolls are always a favourite for savouries and no directions for making them are needed. Asparagus sandwiches made from the recipe given here are also delicious and are not made so often.

Sandwich Filling

1 cup of cooked asparagus tips
½ cup of aspic jelly
½ cup of top milk
½ cup of mayonnaise or other thick salad dressing
Salt and pepper

The tougher stalk ends of the asparagus may be used in soup or salads. Pound the tips, add the mayonnaise, the aspic jelly (warmed until it is liquid), and salt and pepper to taste. Leave the mixture in a cool place until it begins to set, then add the top milk.

To make the aspic jelly add 1 teaspoon of gelatine softened in 1 dessertspoon of cold water to a little less than ½ cup of clear meat stock.

Use white or brown bread, preferably 12 hours old, buttered and cut in very thin slices. Fill the sandwiches generously with the asparagus mixture.

Asparagus Patties

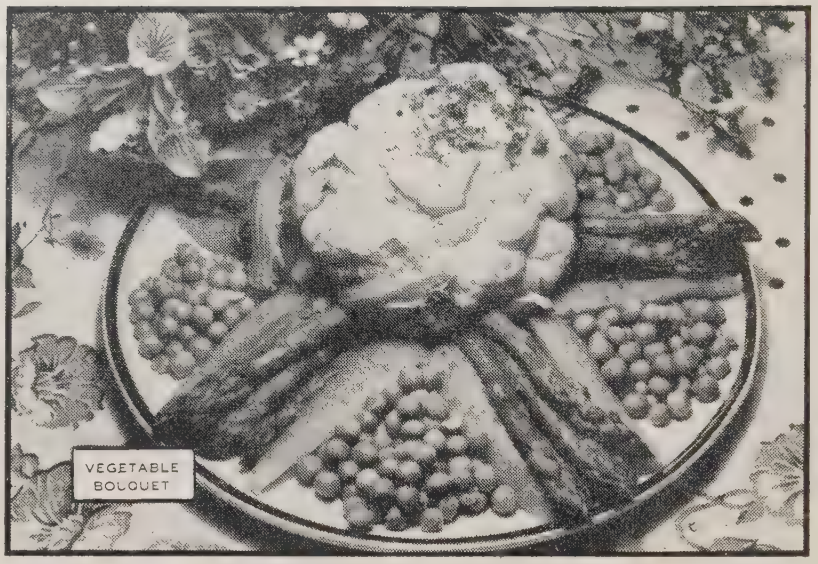
Puff-pastry patty cases can be filled with the sandwich filling and served cold or heated through just before they are required.

Both asparagus sandwiches and patties are sufficiently "special" to grace buffet party or wedding catering.

Vegetable Bouquet

On a fine spring Sunday vegetables may be sent to the table "dressed up." They will look attractive and appetising enough to turn an ordinary cold-meat meal into something exciting.

For a "vegetable bouquet" use a small cauliflower, young carrots, green peas, and asparagus. Cook the vegetables separately, leaving the cauliflower head whole with a few of the tender, inner, green leaves attached. Set the cauliflower in the centre of a large, round serving dish. Arrange the asparagus in small bundles with the heads pointing to the outer rim of the dish. Flank the asparagus with carrots and fill the spaces with green peas. Pour a little thick white sauce over the cauliflower and sprinkle it with parsley.



VEGETABLE BOUQUET

Two Hot Dishes

Two delicious ways of using asparagus are with fish croquettes or in a chicken casserole.

Fish Croquettes and Asparagus

1lb. of cooked fish
Soft breadcrumbs
2 teaspoons of lemon juice
½ teaspoon of grated onion
2 beaten eggs
1 dessertspoon of chopped parsley
Milk
Fat for frying
Salt and pepper

Flake the fish and remove bones, skin, and discoloured portions. Put the fish into a basin, add seasoning, grated onion, parsley, and ¼ cup of soft breadcrumbs, and mix them well with one beaten egg. Spread the mixture on a plate, divide it into portions, and shape them into round, flat cakes with floured hands. Dip each cake into the second beaten egg mixed with a little milk, salt, and pepper. Roll the cakes in breadcrumbs and fry them in deep, hot fat until they are a delicate brown. Drain them on soft, crumpled paper and arrange them down the centre of a hot dish. Put a slice of uncooked tomato garnished with a sprig of parsley on each croquette. On either side of the croquettes lay hot, cooked asparagus in bundles. Pour a little tartare sauce over the asparagus.

FISH CROQUETTES AND ASPARAGUS

Tartare Sauce

½ cup of mayonnaise or salad dressing
4 spring onions
2 teaspoons of lemon juice

Mince the onions, using only the white root end, and mix them with the lemon juice and mayonnaise. Heat the sauce through, but do not boil it.

Mayonnaise

2 tablespoons of butter
2 eggs
1 tablespoon of sugar
1½ tablespoons of flour
1 teaspoon of dry mustard
½ teaspoon of salt
1 small cup of vinegar
1 cup of milk

Melt the butter, stir in the flour, add the milk gradually, and cook the mixture until it is thickened, stirring continually. Beat the eggs, mustard, vinegar, sugar, and salt together and add them gradually to the flour mixture. Take care not to overcook the mayonnaise when the egg mixture has been added.

This dressing will keep for about a week if it is stored in a cool place.

Asparagus and Chicken Casserole

¾lb. of cooked chicken meat, without bones
2 bundles of asparagus
3 tablespoons of butter, mild dripping, or bacon fat
4 tablespoons of flour
2 cups of milk
1 teaspoon of salt
Pepper
1 teaspoon of lemon juice
½ cup of grated cheese

Arrange half the chicken meat in a shallow casserole and cover it with half the asparagus. Melt the butter in a small saucepan and add the flour, stirring continually. When the flour mixture is smooth add the milk gradually and bring the mixture to boiling point, continuing to stir. Add the lemon juice. Pour half the sauce over the chicken and asparagus in the casserole. Repeat the layers of chicken, asparagus, and sauce, then sprinkle the grated cheese over the top. Bake the casserole uncovered in a moderately hot oven (400 degrees F.) for 15 minutes.

[Photographs on this page by Sparrow Industrial Pictures Ltd.

Denman, the English Country Women's College

By NORMA K. METSON,
Rural Sociologist,
Department of Agriculture,
Wellington.

MEETING together in groups with other people whose interests are similar answers a basic human need, especially for those whose lives normally are lonely or isolated. Working together for a common objective is both stimulating and educational. Adult education, in its widest sense, covers all such activities. To be successful it must fit the needs of the people for whom it is intended; they should have a part in supplying it and not feel that it is merely something provided for them. Denman, the English Women's Institute College, is a convincing example of what such a project can achieve.

WOMEN'S Institutes in England in the past 30 years have made unique contributions to the welfare of country people. In addition to the local influence of each institute, the organisation soon gained sufficient status to influence national policy as it affected the rural community, either through official consultation or by deputations and representations to Ministers and officials.

With institutes in almost every village, the membership encompasses an immense fund of knowledge and experience. When an institute is asked, as happens frequently, for a report on some problem affecting country dwellers, the information is precise and detailed, giving facts which would be difficult to obtain otherwise. Similarly, the national federation policy on such subjects as health, children's welfare, and country amenities is carried out through the activities of each local institute.

Country homes from which Women's Institutes draw their membership may be isolated and lonely.

It is also acknowledged that, without the extensive programme of food production and conservation and local marketing carried on during the war and still continuing through the organisational framework of the institutes, the British food situation would have been much more serious.

The institutes have always been independent, organising their own programmes for meetings and training members as officers, organisers, and demonstrators. They have been responsible for a great revival of interest in traditional handicrafts and an increase in the numbers who practise them and for developing groups for the study and performance of music and drama. By means of produce shows, grading for marketing, organised courses, and the awarding of certificates to those who pass recognised tests, the standard of food production, preparation, and preservation has been raised and housewives have been made familiar with modern methods and equipment. Other activities extend from local social events to international contacts through the system of overseas "links," affiliation with the Associated Country Women of the World, and participation in programmes of assistance for war-devastated countries.

Establishment of Denman College

A recent and most notable achievement of this organisation has been the establishment of Denman College, named after Lady Denman, for many years president of the movement. Denman is the country women's college, the result of their efforts and planned to meet their special needs. Though Oxford is only 9 miles away, the college is sufficiently remote to require the address "Marcham, near Abingdon."

It was opened in September, 1948. The stone Georgian house was modernised by previous owners just before the war, but after wartime requisition by the Royal Air Force a good deal of reconditioning work was necessary. Additional sleeping accommodation for 17 students has been arranged in "The Croft," converted from former stable buildings, so now 50 places are available for students.

Army huts left from the wartime occupation are to be turned into workshops and craft rooms, thus lessening the crowding of the main building, where space is ample for living and recreation but a little inadequate for classrooms. The farm land attached to the property totals about 200 acres, most of which is let. About 30 acres have been kept for use in carrying out and expanding instruction in gardening, the cultivation of small fruits, and the care of animals and poultry.

The unique quality of Denman as a result of the co-operative efforts of many people is practically illustrated in the furnishing of the bedrooms.

Women's Institutes flourish in villages such as this—Middleham, in Yorkshire.

Each has been the responsibility of a different county, which has provided the money for furniture and the craftwork and sewing for quilts, curtains, rugs, cushions, and accessories. Patchwork, quilting, drawn thread, cross-stitch, smocking, wool work, every kind of embroidery, hand-made lace, tatting and crochet, rugs, chairs and stool seats, hand-woven fabrics, pottery, book bindings, metal, wood, and leather work—every room displays many of these crafts and reflects the skill and patience of hundreds of women from every part of the country. Some gifts of antiques have been used, but most of the ordinary furniture is of the utility range in light wood. In spite of the diverse origins of the contents, no room appears cluttered or inharmonious; simplicity and charm are everywhere.

Work of the College

The college is managed by a board of trustees. The warden and staff concerned with administrative and domestic affairs are in residence, and instructors for the courses are usually university staff from Oxford or specialists from the Ministries of Agriculture and Education. For crafts, institute affairs, and some other subjects experts from within the organisation are used.

Courses are normally from Monday to Friday. All students live at the college and their ages may range from 17 to 60. They come from all over the country and not infrequently from overseas as well. (At New Year a special house party is arranged for overseas visitors to Britain.) The 5-day courses facilitate arrangements by housewives to leave home, as no week-end is included. Members must pay board during their stay, but fees for courses are low—only 5s. or 10s. Some institutes and county federations arrange for scholarships so that no member is debarred from attending by lack of money.

Courses are of two types, the first for those who are interested in subjects as individuals and the second for those who are willing to pass on what they learn to other institutes in their county. As practical courses—for example, gardening, toy making, and catering—are limited to 15 students, they are usually held concurrently with others such as "Books and Music" or "Life and Leisure." The two groups then combine for outings and evening activities—singing, films, play readings, or music—and the widening of interests benefits both.

This balance and variety of programme are regarded by the college as among its most valuable features. The student comes primarily for a course covering a certain subject, but she will also read books in the library, possibly visit the Oxford colleges, and gain much from her experience of community life, brief though it is. Before they leave after a course the women are asked: "What have you enjoyed most—what has meant most to you?" Often they will say it is the music, or the books, or meeting the other women, and not the course itself, though they find the subjects of courses absorbing enough.

New Conception of Education

The short course is a relatively new conception in English adult education, which has been based on a tradition of long and intensive study fulfilling the functions of an extra-mural university. Denman's achievement is different. Students already have the ideals and training of the Women's Institutes; they have also an immense pride in the fact that the college is their own, the result of their planning and labours. There, after years perhaps, in isolated villages, they meet women from other districts and often from other countries, and these meetings and the group life can teach more than hours of study.

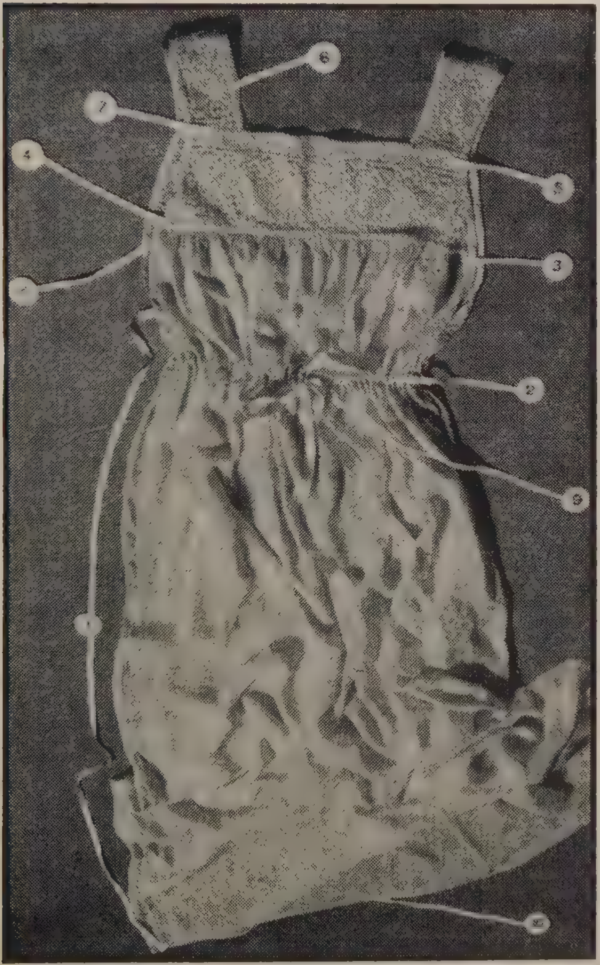
The practical courses are based on the familiar needs of institute members who come to learn certain specific skills or facts and are taught them as rapidly and efficiently as possible at an adult level. The other courses—such as "Country Housewives," "Life and Leisure," "An Approach to History," and "Books and Music"—are pointers for minds that are seeking for something to enrich life beyond everyday routines.

In the 6 months from September, 1949, to March, 1950, 28 courses covering 19 subjects were offered to individual members, and 21 additional courses were for women prepared to pass on what they learnt in the capacity of demonstrators, speakers, or officials of the movement. Subjects in the first group were "Country Housewives" (6), "Pickling and Preserving," "Books and Music," "Life and Leisure," "Gardening" (2), "Catering for the Home and Local Functions," "Christmas Course" (3), "Soft Toys," "Smocking," "Commonwealth Visitors," "Catering for Numbers" (2), "Dressmaking and Fashions," "Drama," "Ideal Home," "Gloving," "Health and Safety in the Home," "An Approach to History," "Children's Clothes," and "Plays and the Theatre." The second group covered "Music," "International Studies" (2), "Produce Marketing," "Handicrafts," "Ways of Teaching and Speaking," "Public Questions," "Drama," and "Schools for Institute Officials."

In so young an institution much of the work being done in organisation, methods of teaching, and content of courses is still experimental. One important conclusion already reached is that expansion to meet greater demands for this type of education should take the form of more units to be established in other parts of the country and not of an increase in the size of Denman. The aim above all is to keep the atmosphere of friendliness and individual interest which is possible only in small groups.

A
QUICKLY AND EASILY MADE NIGHTGOWN

A QUICKLY and easily made nightgown for summer wear which is attractive enough for holiday visiting will appeal to the woman who loves dainty underwear but has little time to spare for making complicated styles with much hand finishing. In this article Eva Topping, Rural Sociologist, Department of Agriculture, Auckland, gives a nightgown pattern, easy to copy and quick to make, which may be varied at will to give several pretty styles.



[*Sparrow Industrial Pictures Ltd. photo.*

The numbers in this illustration correspond to those in the instructions on the next page for making up the nightgown.

[*Sparrow Industrial Pictures Ltd. photo.*

A LIGHTWEIGHT material makes this type of garment; triple ninon, lingerie sheers, lawn, muslins, voiles, and fine rayons are all suitable. For yoke and trimmings the choice includes piece lace, cotton net, wide lace insertion, embroidered muslin, beadings, lace edgings, and ribbon.

The nightgown illustrated takes about 3yds. of material, the exact amount depending on the height of the wearer. Measure the length from the bust line to the floor and add 3in.; double this length (for back and front) and add about an extra ½yd. for turnings, casing, and bindings. Thus, if the measurement is 41in., the length required is 41in. plus 3in. doubled, making 2in. less than 2½yds., so 3yds. leaves ample material for the binding and turnings.

The yoke requires ⅞yd. of 5in.-wide and ½yd. of 2½in.-wide insertion, or ¼yd. of 36in. wide or ⅜yd. of 24in.-wide piece lace.

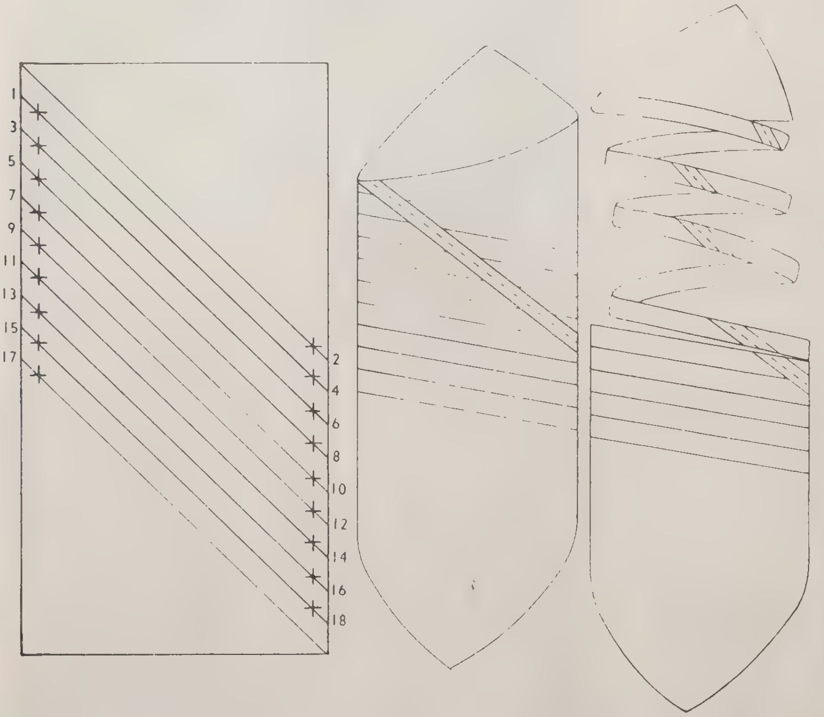
Other materials needed are 2yds. of double satin ribbon and 1 reel of silk substitute to match the ground colour of the material.

Cutting the Material

Cut two pieces, one for the back and one for the front, to the required length—that is, the measurement from the bust line to the floor plus 5in., which gives the necessary depth to the bodice (3in. above the bust line) and an extra 2in. for turnings. Then cut two 1in. strips across the full width of the material for the casing at the waistline. Reserve the remainder of the material for bindings.

The yokes are two pieces 5in. wide by 14in. long, with the short sides shaped slightly as shown in the bottom diagram on the next page.

A QUICKLY AND EASILY MADE NIGHTGOWN

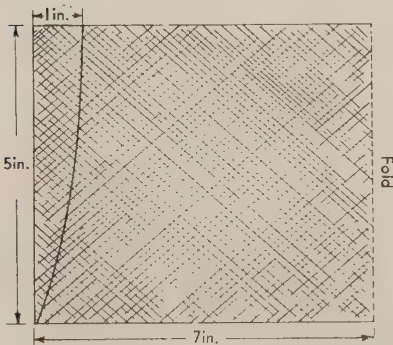


Joining and cutting material to give a continuous length of bias binding. Left—The material numbered and marked ¼in. from the edges. The mark at 1 is folded to that at 2, that at 3 to that at 4, and so on down the length of the material. Middle—The seam tacked and stitched so that the material forms a tube. Right—Cutting the tube from one end of the line to the other forms a continuous strip of bias binding. This method is quicker and neater than joining each strip separately.

The shoulder straps are 2½in. wide and about 9in. long, but the exact length will be adjusted on the figure. The short edges probably will need to be sloped slightly.

Making up the Nightgown

1. Stitch the side seams, leaving the top edges open 3in. for the armhole. The seam may be a flat fell or french seam, or with fine materials time can be saved by making a mock french or upright fell seam, which needs only one row of stitching.



Piece lace 14in. by 5in. to be cut to make one yoke.

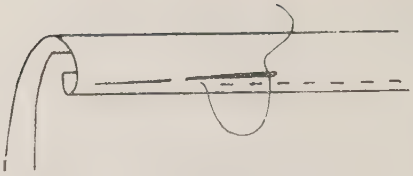
2. Measure the length from hem to waistline and mark the material straight across the width. Join the two 1in. strips, turn ¼in. along the length on each side, and stitch the strip on the wrong side of the material to make the slot for the waist tie.

3. Gather the top edges of the bodice with three rows of stitching, starting ¼in. from the edge and leaving ¼in. between rows. The gathering can be done on a sewing machine; stitch on the right side of the material, having lengthened the stitch and loosened the tension. Fasten one end of the under thread, take the other end, and pull up the thread to the required length (14in.). Fasten off firmly and distribute the fullness evenly.

4. Pin the yoke pieces in place on the back and front with the wrong sides together. Tack and then stitch seams on the first line of gathering; trim as close to the edge as is safe, press the material, turn it to the wrong side, and stitch again on the second row of gathering.

5. Bind the top edges of the yokes, back and front. Stitch the binding on the right side, trim the seam, press the binding over to the wrong side, and hand hem or catch stitch it in place.

6. Bind the inside edges of the shoulder straps, then try on the nightgown so that the straps may be adjusted to the figure to lie flat over the shoulder and at the back and front.



A mock french or upright fell seam.

7. When their positions have been decided, stitch the straps in place by hand. Turn a narrow hem and stitch on the same line as the lower edge of the binding on the wrong side. Hem the top of the yoke binding on to the straps on the right side.

8. Bind the armhole, ends of yokes, and outer edges of shoulder straps in one operation.

9. Make two slits ⅜in. long and 1in. apart at the centre front of the waistline over the casing. Buttonhole stitch the slits, taking the stitches through the casing also on the inner side and through the single top layer of material only on the outer. Thread ribbon through the casing for the waist tie.

10. Make a narrow hem at the foot of the nightgown.

When the making up has been completed press all seams and bindings and the nightgown will be ready to wear.

To vary the style self material can be used for the yoke, finished with bindings in plain colour to repeat one of the colours in the pattern, or the binding may be of self material with narrow lace edging round shoulder straps, yoke, and armholes. Allow an extra ¼yd. of material for the yoke.

Another variation could be obtained by using cotton net for the yoke with an edging of lace insertion and binding. Other adaptations of the pattern will occur to the needlewoman.

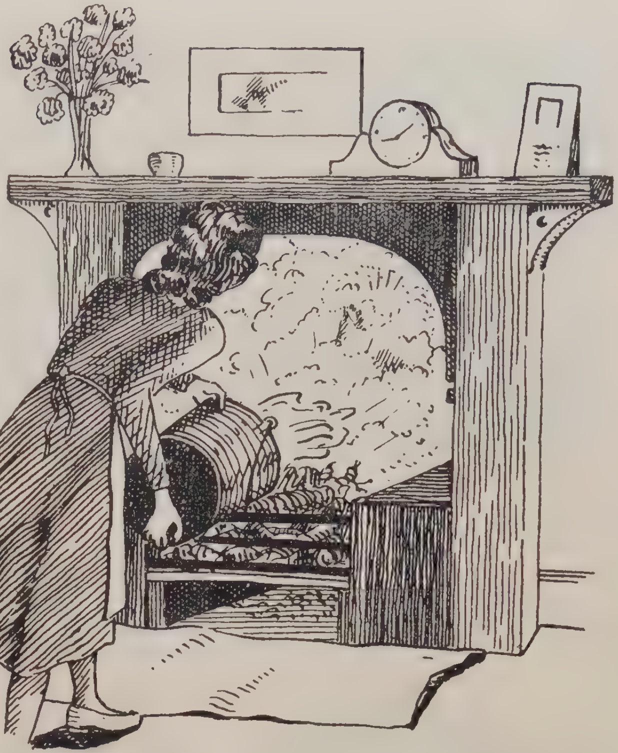
Cutting the Bindings

Here is a method of cutting bias binding from a narrow piece of material which produces one continuous length of binding with all the seams running in one direction and on the same side:—

Trim the piece of material to a rectangle. Fold it on the true cross and pencil or press in with a warm iron lines parallel to the fold. Number the lines as shown in the diagram, noting that the top line has no mark at its left-hand end and the bottom line none at its right-hand end. Make a mark ¼in. in from the edge at each number. Fold the material into a tube, leaving the lines on the outside, and having the mark at 1 coincide with that at 2, that at 3 with that at 4, and so on down the length of the material. Pin the material in position at each pair of marks. Baste down the edges and stitch them carefully so that the matched lines do not slip. Trim the seam as narrow as possible and press it open. Begin cutting along the first pencilled line at one end of this tube and continue until the other end is reached, making a continuous length of binding. This is a quicker and neater method than joining each strip separately.

How to Deal with a Chimney Fire in the Farm Home

THOUGH prevention of chimney fires by attention to regular sweeping should be the aim, those who live in the country, where fire-fighting services usually are not available, should be able to deal effectively with chimney fires, as there is always a danger that such outbreaks may spread and cause serious damage. In this article Eirene E. Unwin, Rural Sociologist, Department of Agriculture, Dunedin, explains the procedure for quelling chimney fires.



Before an attempt is made to put out the fire in the chimney a wet sack should be placed on the hearth and the fire in the grate or range put out with water. The sack not only absorbs any water which may trickle down, but checks falling lumps of burning soot from rolling out.

AS a first step in extinguishing a chimney fire place a wet sack on the hearth and put out the fire in the grate or range with water. The sack not only absorbs any water which may trickle down and might otherwise cause damage to carpets, but checks falling lumps of burning soot from rolling out and setting alight things in the room. As a further precaution a spark guard should be placed in front of an open fireplace.

As falling soot is probably the greatest danger with a chimney fire, preventing burning fragments from rolling on to the floor and setting fire to the room is a most important preliminary safeguard.

To check the supply of air to the flames close all doors and windows leading into the room and, if there is a draught regulator in the chimney, close it.

Pouring Water down Chimney

When the wet sack on the hearth and the spark guard are in position and the fire in the grate is out attend to the fire in the chimney. The most efficient but not always the most simple method of dealing with the fire is to pour a bucket or two of water down the chimney from the top. It is best to splash the water down.

Do not lean over the top of the chimney, as the water will at once be turned into steam and there is a danger of being scalded by the clouds of steam which will pour out of the chimney.

However, the roof of the house may be too steep or the chimney too high for the top to be easily reached by anyone carrying buckets of water, or there may be other reasons why it is not possible to splash water down from the top. There is a possibility of the chimney having been weakened by an earthquake and being liable to collapse under the extra weight of a person on a ladder, or there may be no one available who is experienced in climbing ladders; great care is needed when mounting a ladder resting against a chimney.

Directing Water up Chimney

If for any reason the fire must be put out from below, water must be directed up the chimney with a bucket pump, or if the pressure in the water main is sufficiently high, by a hose connected directly with a tap.

It should be realised that whether the fire is put out from above or below very little water reaches the hearth. It is turned into steam in the chimney and it is actually the clouds of steam which mainly are effective in putting out the flames, as they cut off the supply of air to them. The wet sack in the hearth will, however, absorb any water which may trickle down. Even the water used at first to put out the fire in the grate almost all turns to steam, which also will help to check the flames in the chimney.

It is not advisable to put a wet sack over the chimney in an attempt to put out the flames.

This method will put out the fire eventually, but the water in the sack evaporates quickly and, if the sack is not wetted again, it also will catch fire. However, the chief drawback to this method is that it drives the smoke down into the room and this can do a great deal of damage to furnishings and wallpaper. Little or no damage is done by putting the flames out with water.

Keep Equipment Handy

As a precaution a bucket pump or hose reel should be kept in an easily accessible place. It should be used at once on any flames that have got out of control, except of course on an oil or petrol fire. Direct the stream at the base of the flame.

A bucket or stirrup pump is simple to use, and one person can both pump it and direct the water where it is needed while another person, if available, can fetch more water to refill the bucket if necessary.

If a farm home has a water supply with sufficient pressure, the installation of a hose reel affords even better fire protection than a bucket pump. The reel is easier to operate and the supply of water is continuous, but if one is to be installed it is essential to ensure that adequate and permanent water pressure is available. An electric pressure pump does not guarantee this because of the dependence upon the continuity of the electricity supply. A bad fire is almost certain to melt some of the wiring and so cut off the electricity from the pump.

Chemical Extinguishers

Chemical extinguishers are useful but most of them need overhauling at least once a year, as they may deteriorate even if they have not been used. The metal chemical container of an old extinguisher may corrode and there is then a danger of its exploding when an attempt is made to use it. On the whole a bucket pump, or, where water pressure is adequate, a reel hose, is probably the safest and simplest home fire-fighting equipment, especially in farm homes, which are rarely within fire brigade areas.

Christmas Gift Subscriptions

TO avoid late delivery caused by the congestion of Christmas mails, gift subscriptions to the "Journal" should be paid to the nearest office of the Department of Agriculture not later than Friday, December 1.

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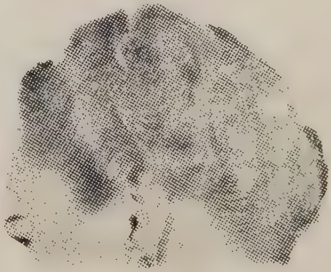

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THE MUSEUMS OF NEW ZEALAND

TWO more provincial museums, the Rotorua Museum, which was formed from a private collection, the Whaka Treasure House, and the Timaru Museum are described in this month's article in this series by Enid B. V. Phillips.

Rotorua Museum

THE conglomeration of objects which accumulate in the average small boy's pocket is likely to give even the most happy-go-lucky mother cause for dismay at times, but when, in addition to the usual miscellany, he secretes bugs and beetles and other choice specimens betokening a more than passing enthusiasm for natural history, a parent can be justifiably pardoned for feeling a trifle horrified. The wife of one of Hamilton's earlier stationmasters was certainly no exception in this case. Maternal misgivings notwithstanding, young Frank Oscar Peat blithely continued with his collecting, being singularly fortunate when the family was transferred to Opua in forming a friendship with the well-known naturalist A. T. Pycroft.

Eager beginner and experienced collector, together the pair explored the many lovely coves and mysterious caves in which the Bay of Islands abounds, and once during the holiday season they spent a memorable month on the Hen Island in the Hauraki Gulf. The schooner Greyhound put them ashore on the island at night, but unluckily the rocks they had selected for their landing-place were directly beneath a shaggery, so the hapless travellers perforce had to stay there until daylight before they could strike inland. There were no means of communication with the outside world, and during the whole of their self-imposed sojourn in this solitary spot their sole sign of human life was a signal from the crew of the Greyhound as she passed on her fortnightly trip back to port.

Pot-shot from Bedroom Window

Most of the birds in Frank Peat's collection were obtained at Opua. His family relate how on one occasion he was so keen to secure a particular bird he observed close to the house soon after daybreak that he did not even wait to throw on some clothes and stalk his quarry out of doors, but seized his gun and shot it through the open window, thereby waking the entire household and thoroughly startling his two brothers who were sleeping in the same room with him.

On leaving school he served a 5-year apprenticeship with C. M. Page, an Auckland watchmaker and jeweller, in this way developing a lifelong appreciation of other marvels of nature peculiar to New Zealand—kauri gum and greenstone. When he started in business for himself he decided on the town of Dargaville as the most suitable place, the district in those days being full of gum diggers. They were only too pleased to put any likely samples aside for him, and though sometimes he had to purchase a quantity of inferior gum to get the piece he wanted, he did not grudge the outlay, and would promptly set about shaping and polishing the desired specimen, often a long and tedious process, as it was done entirely by hand. In this way he built up a magnificent collection of kauri gum. Much greenstone came his way, too, and many ancient Maori carvings (he had learnt much concerning Maori curios from E. Spencer, the noted dealer, during his apprentice days in Auckland), and in 1928, when he retired, he erected a concrete building 60ft. x 27ft. at Titirangi, near Auckland, for the express purpose of housing his treasures.

The Treasure House, as it was called, was the first private museum to be honoured by a visit from S. F. Markham, M.A., B.Litt., who was making a tour of the principal museums in the British Empire on behalf of the Museums Association, London. After inspecting the Treasure House in company with Dr. W. R. B. Oliver, Director of the Dominion Museum, Wellington, he asked permission to place it on record in "A Directory of the Museums and Art Galleries in Australia and New Zealand," which he was compiling with the assistance of Dr. H. C. Richards. The volume was published in 1934, the year after his trip to New Zealand, publication being made possible through financial aid from the Carnegie Corporation of New York. The Peat collections were later bought by the New Zealand Government, and the kauri gum was brought to the capital in time for the opening of the new museum and art gallery which had been built on Mt. Cook.

[*Moore and Thompson photo.*

Portion of the Whaka Treasure House, showing some of the kauri gum specimens.

The Second Treasure House

However, once a collector, always a collector, and Mr. Peat again commenced assembling a collection which, though not as large as the first, was very fine and thoroughly deserved its description as one of the unique attractions of Rotorua, for it was at Whakarewarewa, several miles south of the town, that he established his new Treasure House.

There was a natural alum bed in the grounds, and the pure crystallised mineral could be seen rising through the floor of the Maori temple which had been built on this spot. The immense totara panels in the temple were intricately carved to represent religious symbols, effigies of ancestral heroes, curious creatures from mythology, and traditional scroll or double-spiral designs. Several successive generations of celebrated carvers had made these masterpieces their life work, a single panel usually taking many years of patient toil to complete.

The array of greenstone artifacts within the Treasure House was not only of great historical value, but illustrated another aspect of craftsmanship at which the ancient Maori excelled, the display gaining added interest when viewed in conjunction with the rare prints portraying famous chieftains and their tribesfolk, scenes from Maori history, etc., which were displayed round the walls, and the cabinets of hunting and fishing implements, canoe paddles and balers, calabashes and cloaks, and other domestic appurtenances of the Maoris.

Realistic Setting

In the natural history section much use had been made of moss and leafy twigs against backgrounds of painted scenery to show the kiwis, huias, and other New Zealand birds in as realistic a setting as possible. The tuatara, the oldest reptile in the world, was also on exhibition, together with the oldest mammal, the small, furry, four-footed platypus, popularly known as the duckbill because of the shape of its snout, which has the nostrils placed near the top. Nature has provided it with two pairs of horny plates on each jaw to do duty instead of teeth.

The shell exhibits ranged from the humble pupurangi or kauri snail (which numbers nearly 50 varieties in New Zealand alone and lays white-shelled eggs in a leafy nest on the floor of the forest and, like the much-publicised

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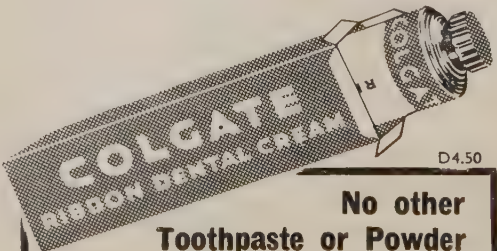

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COLGATE-PALMOLIVE, PETONE

[*From the Alexander Turnbull Library photographic collection.*
Kauri gum being prepared for marketing by Maoris in Northland about 40 years ago. It was from the gum diggers that F. O. Peat obtained the specimens for his Treasure Houses.

early bird, prefers a worm diet) to the proud argonaut or paper nautilus, whose pearly, embossed shell, primarily a repository for the egg mass, is so fragile that perfect specimens are seldom found on New Zealand's rocky coastline. For an individual collector to have acquired six such specimens, as was Mr. Peat's good fortune, was a distinct achievement.

Nevertheless, as might be expected, the mainstay of the Treasure House was the kauri gum, these remarkable specimens, recovered from swamps that were once the site of mighty forests, being appropriately arranged in mottled-kauri showcases and revealing an incredible depth of colouring. Even a slight change in the angle of the light, for instance, would cause a flush of bronze to pass instantaneously to clear chrome, or a dark yellowish-brown to grey-green or emerald. A prismatic tinge was apparent in certain pieces; in others, the gradations of shading were so subtle as to be almost imperceptible. "With inexpressible delicacy the many tones of yellow mingle together—amber, wine, honey, sulphur, straw, bronze, gold. In a bright light or when the sun's rays are caught and retracted, firelike reflections—copper, crimson, scarlet, orange, garnet, dark hyacinth, or deep ruby red—blend with softer hues. Under favourable conditions there is an intensifying of all colour to a gemlike quality. The larger specimens contain wisps of white vapour, imprisoned for many thousands of years. These resemble 'mackerel skies', the most purely beautiful of all the visible shapes which vapour takes in the heavens. Sometimes the texture is thin and delicate; sometimes it gathers into globules or rounded tufts or fleeces, but all are ruled by a definite plan or direction. Other specimens sparkle with prismatic drops or show a fine tracery of branch or spray, or the structure may take the form of variegated marble."

[*J. D. Richardson photo.*
Shells of the kauri snail, an exhibit in the Whaka Treasure House.

Kauri Gum "Vase"

One unusual sample discovered by a prospector in a cave on the Tangihuia Range, between Dargaville and Whangarei, is regarded as being without peer, not only because it is shaped like an epergne, but because the gum is still in its natural state, although the kauri root to which it clings and the solitary rewarewa leaf adorning one side of the "vase" are petrified.

In 1942, when Mr. Peat wished to retire from custodianship of his collection of treasures, the Rotorua Borough Council took over the entire contents of the Whaka Treasure House and set it up in the municipal buildings, thus acquiring a museum ready-made. The man whom the late Rt. Hon. Gordon Coates declared a "national asset" because his diligence as a collector preserved for his country so many valuable articles which would otherwise have been lost or sold overseas died in 1945, but the treasures he spent a lifetime collecting remain to give pleasure and enlightenment to countless generations to come. His widow has gone back to Titirangi to live, and in the congenial atmosphere of a home containing so many rare and beautiful curios that it is really a museum in miniature his son Huia practices a craft which is fast dying out in New Zealand, the polishing of greenstone.

Timaru Museum

There are many exquisite examples of the potter's craft to be found in the museums of this country, but few possess the power to charm the eternal feminine, whether little girl or grandmother, like the dolls' china donated to the art gallery and museum in Timaru (the town whose melodious Maori name is interpreted, "In the shelter of the cabbage trees") by Mrs. Arthur Hope, a descendant of a well-known pioneer family of South Canterbury.

Without doubt, the loveliest of these Lilliputian treasures is the Staffordshire dinner service, every piece from the 3in.-diameter soup and dinner plates to the oval vegetable dishes and tureen being rimmed with green and bordered by a strawberry-leaf design in a deeper shade on a cream ground. The largest of the 4 ashets (flat dishes) is only 6in. long and each wee gravy boat has a platter of its own.

Tiny Japanese Tea-set

The tea-set, of bluish-white porcelain patterned in a dark, rich blue and bearing the former owner's monogram, "H", is of Japanese origin. The tiny teapot is just 2½in. high and the bowl-like cups are devoid of handles in the traditional Japanese fashion, though the large, deep saucers are reminiscent of Western-style tea-services.

Another fascinating item from the Land of the Rising Sun is a combination plate and saucer 1½in. long, the cup being proportioned accordingly

[*From the Alexander Turnbull Library photographic collection.*
Washing kauri gum chips in swamp-land in Northland. On the right of the spade is a gum spear, by which the gum is found.

and intended to hold the early-morning tea for the mistress of the dolls' house. The pewter teapot with its matching sugar basin and cream jug is on a similar scale, and the kitchen equipment is completed by a minute milk billy and a quartet of shining copper saucepans with lids that can be lifted on and off although not one of the pots measures more than 1in. in diameter.

Some pieces of the dolls' furniture, such as the tripod table with its circular top, the double-ended couch upholstered in pale-blue satin, and two diminutive chairs, are said to be replicas of the suites in vogue in the 1820's, but the four oak dining chairs are of a comparatively modern design. Dinner by candlelight was evidently the mode among dolls in those days, the delicately wrought candlestick of clear glass (the base barely ¾in. across) containing a rosy taper the size of a wax match.

The Rockingham china tea-set, the gift of another donor, is full size, and the elaborately handled teapot is accompanied by a correspondingly capacious cream jug and sugar basin, rationing of these commodities being completely unheard of in Victorian days. The dimensions of the cake plate indicate that it was plainly intended to hold one of those huge plum-cake confections detailed with such prodigality in 19th century cookery books, most of these recipes beginning: "Beat together 1lb. butter and 1lb. sugar; add 1 dozen eggs. . . ."

The shallow, bowl-shaped cups are heavily scrolled and gilded with bunches of grapes to a depth of 1½in. round the inner rim and the same motif is repeated on the wide saucers. Indeed, all the plates are similarly gilded, the width of the design varying according to the size of the article, and the floral device of blue, red, green, and gold at the bottom of each cup is also painted in the centre of the cake plate and on the sides of the jug and sugar bowl.

Cobwebby Laces

The scarves, collars, and handkerchiefs of Honiton, Point, Brussels, and other cobwebby laces are the contribution of Mrs. T. Greg and Miss H. Hope, sisters of the late Arthur Hope. They also gave the embroideries executed on silk, satin, linen, and cotton materials, including samples of English, French, Italian, Greek, Chinese, and Indian work of the 17th, 18th, and 19th centuries, the naming and explanatory notes of which were carried out by W. A. J. Wace, of the Textile Department at the Victoria and Albert Museum, London.

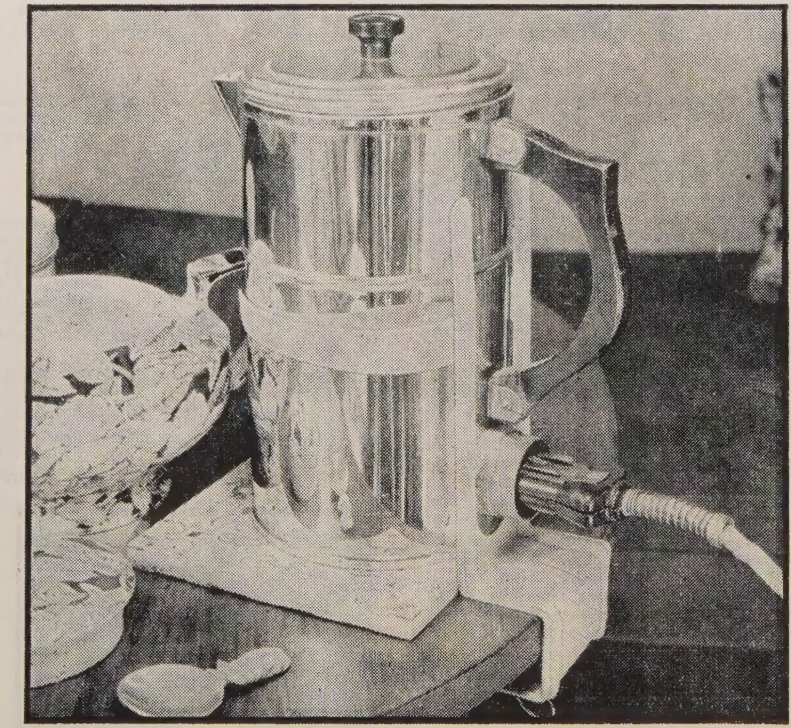
Since 1922 these beautiful exhibits, together with toys, Samoan curios, Wedgwood and Staffordshire pottery, autographs, early book editions, and a case illustrating the origin of seashore pebbles, shared a large room with the art gallery in the library building. By 1935, however, the space was taken over by a children's library; only a portion of the pictures and a few showcases being left. Four years later, when further expansion became necessary, these cases had to be removed altogether. During the war the museum pieces went into storage and it is only recently that items have been culled from the collections for display in two glass cases, one in the entrance vestibule and the other on the landing of the main library.

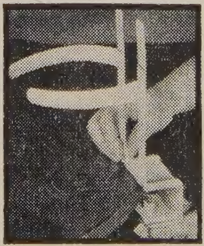
The South Canterbury Art Society went into recess some years ago, but the South Canterbury Historical Society has since come into being. The late Mr. A. E. S. Hanan, formerly Mayor of Timaru, who was a keen ornithologist, took a prominent part in the affairs of the society, which has shown itself to be a virile body.

The South Canterbury Historical Society's activities of late have been greatly stimulated by the legacy of the late T. D. Burnett, who bequeathed his property in Perth Street to the Timaru City Council to provide "a pioneer hall for the preservation, housing, and display of such paintings, pictures, works of art, records, and articles of any nature whatsoever as may be of interest to the burgesses of Timaru and particularly those of a historical character."

It was Mr. Burnett's wish that the site, which is on a slight rise, should be named Pioneer Hill, and the council has already approved the expenditure required for remodelling the brick and stone building to provide a suitable home not only for the Hope collection but for the laces and fans, the sea-green taffeta gown, mittens, and accessories from a bridal trousseau of 1860, and the colourful paintings, patchwork quilts, and other relics the society has in its care and which will form the nucleus of an early settlers' museum in South Canterbury.

A Safety Device for Electric Jugs





ALL too frequently reports appear in the newspapers of accidents caused by boiling water from electric jugs being spilt on small children who have pulled the flex or caught their hands in it. The flex of a jug can be secured in one of several ways to avoid such accidents, but the safest and best method of securing the jug is illustrated. A stand with two arms to encircle the jug has a clamp which can be fixed to the edge of a shelf or table. The stand holds the jug firmly and no amount of tugging at the flex will upset it. A small shelf for the jug with the stand clamped to the edge would ensure that no such accidents could occur.

—*EVA TOPPING, Rural Sociologist,*
Department of Agriculture, Auckland.

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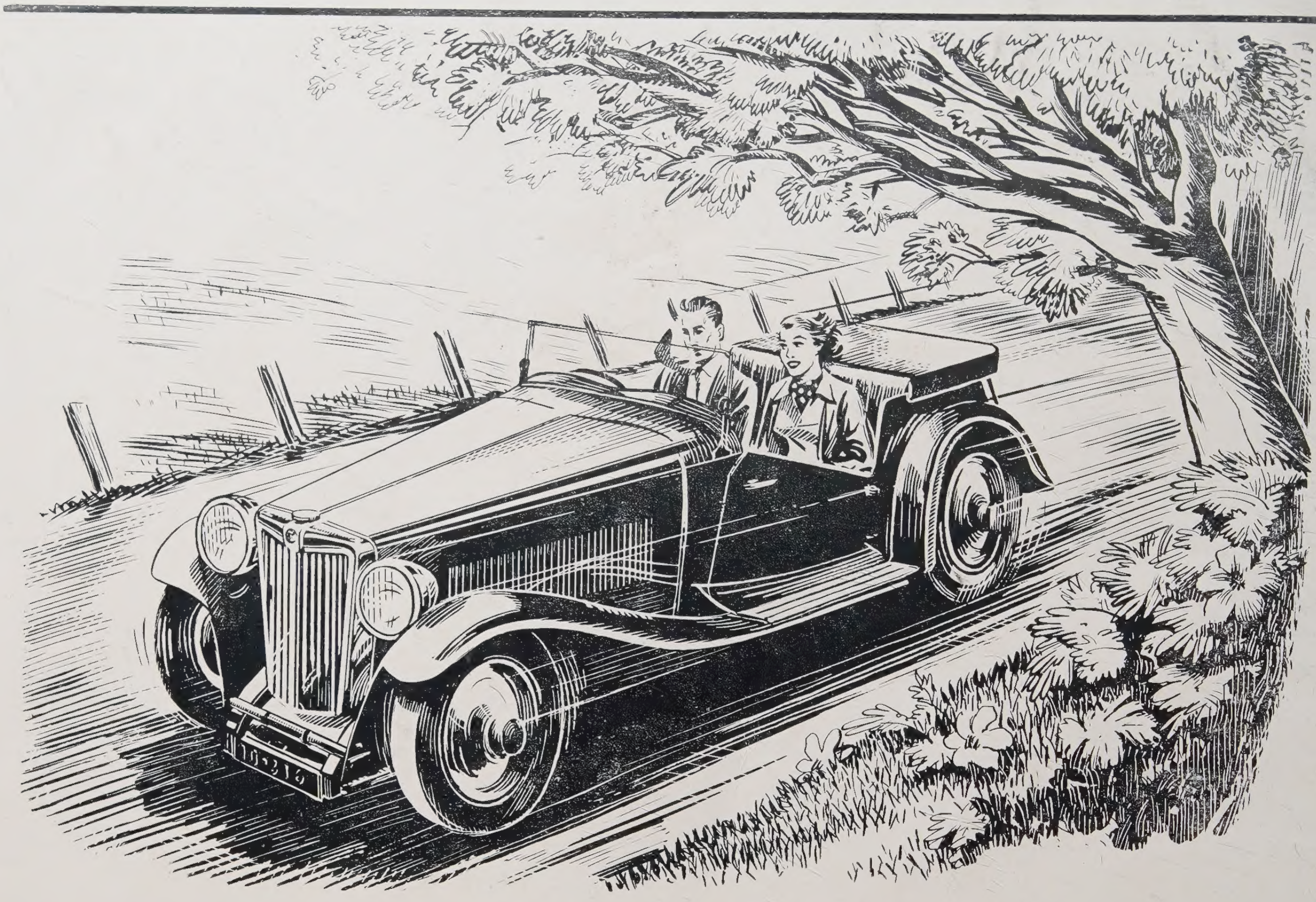

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